US009251530B1

(12) **United States Patent**
Dachis et al.

(10) **Patent No.: US 9,251,530 B1**
(45) **Date of Patent: Feb. 2, 2016**

(54) **APPARATUS AND METHOD FOR MODEL-BASED SOCIAL ANALYTICS**

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(73) Assignee: **SPRINKLR, INC.**, New York, NY (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 461 days.

(21) Appl. No.: **13/601,151**

(22) Filed: **Aug. 31, 2012**

(51) **Int. Cl.**

G06F 17/30	(2006.01)
G06F 15/16	(2006.01)
G06Q 30/00	(2012.01)
G06Q 30/02	(2012.01)

(52) **U.S. Cl.**
CPC ***G06Q 30/0242*** (2013.01); *G06Q 30/02* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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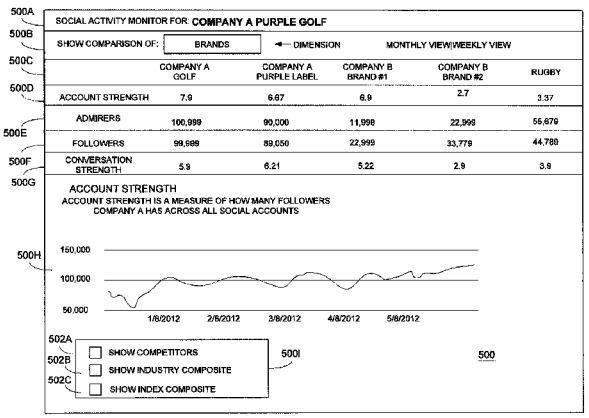
Primary Examiner — Ario Etienne
Assistant Examiner — Ho Shiu
(74) *Attorney, Agent, or Firm* — Schwabe, Williamson & Wyatt

(57) **ABSTRACT**

A model based social analytic system collects social signals from social network accounts for different companies and constituents. The social signals can be used to benchmark social network performance for different contextual dimensions, such as industries, companies, brands, etc. Conversations may be identified in the signals and the types of constituents participating in the conversations may be identified. Analytics can then be determined for the contextual dimensions based on the related conversations and the types of constituents participating in the conversations.

24 Claims, 24 Drawing Sheets



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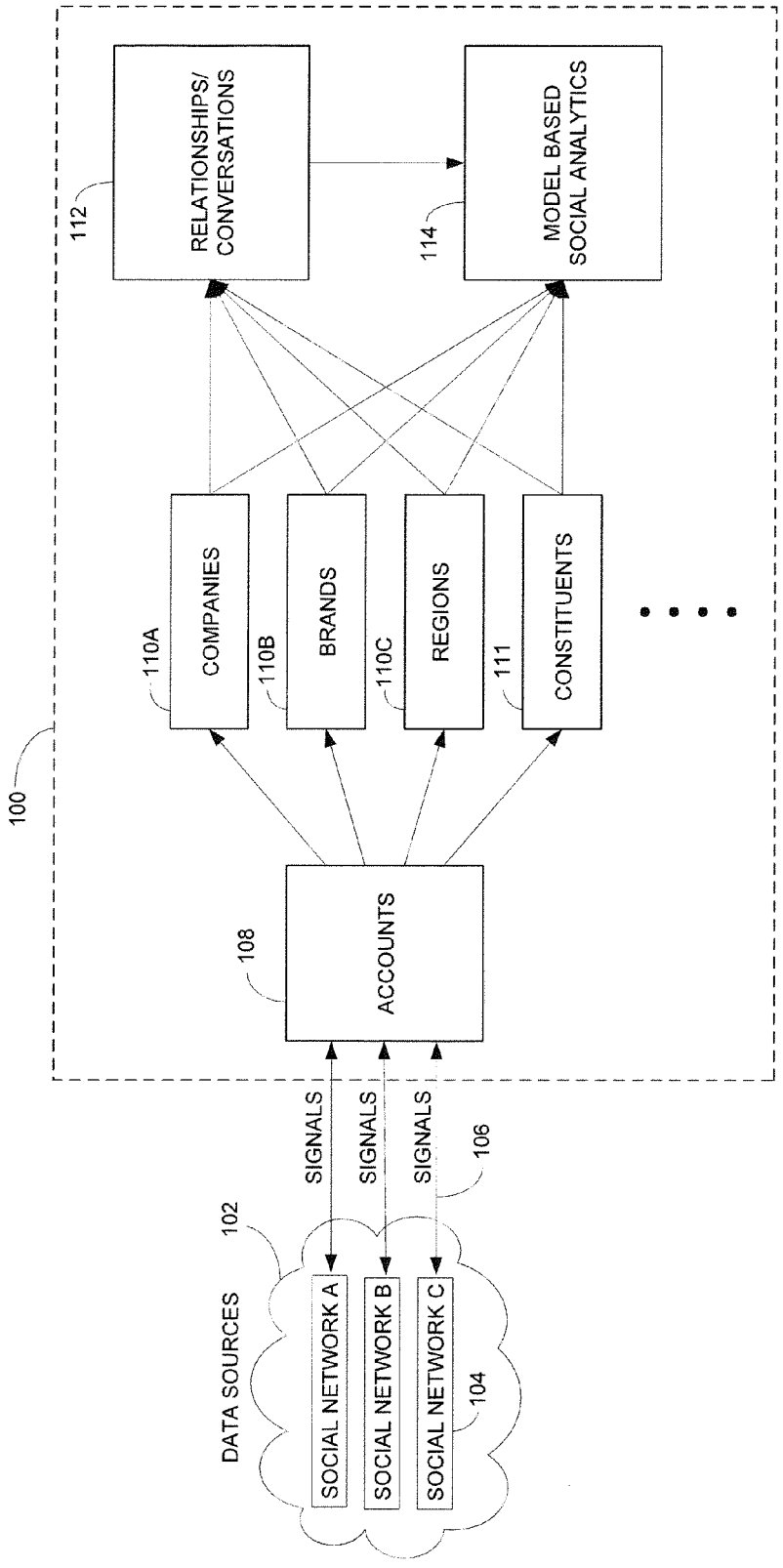
100
RELATIONSHIPS/ CONVERSATIONS
112
MODEL BASED SOCIAL ANALYTICS
114
COMPANIES
110A
BRANDS
110B
REGIONS
110C
CONSTITUENTS
111
ACCOUNTS
108
SIGNALS
SIGNALS
SIGNALS
106
DATA SOURCES
102
SOCIAL NETWORK A
SOCIAL NETWORK B
SOCIAL NETWORK C
104

FIG. 1

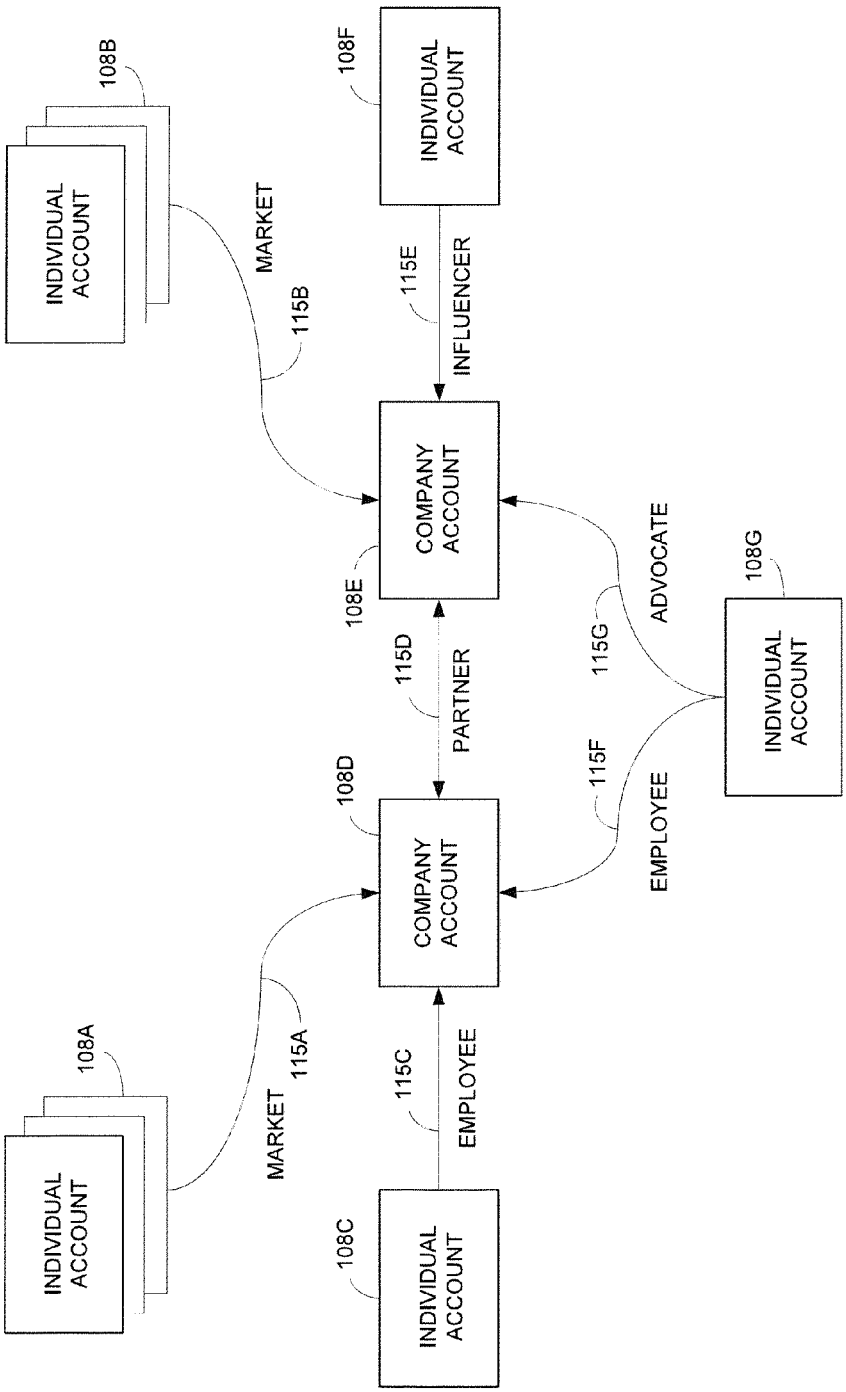
INDIVIDUAL ACCOUNT
108A
MARKET
115A
INDIVIDUAL ACCOUNT
108B
MARKET
115B
INDIVIDUAL ACCOUNT
108C
115C
EMPLOYEE
INDIVIDUAL ACCOUNT
108F
115E
INFLUENCER
COMPANY ACCOUNT
108E
115D
PARTNER
COMPANY ACCOUNT
108D
115F
EMPLOYEE
115G
ADVOCATE
INDIVIDUAL ACCOUNT
108G

FIG. 2

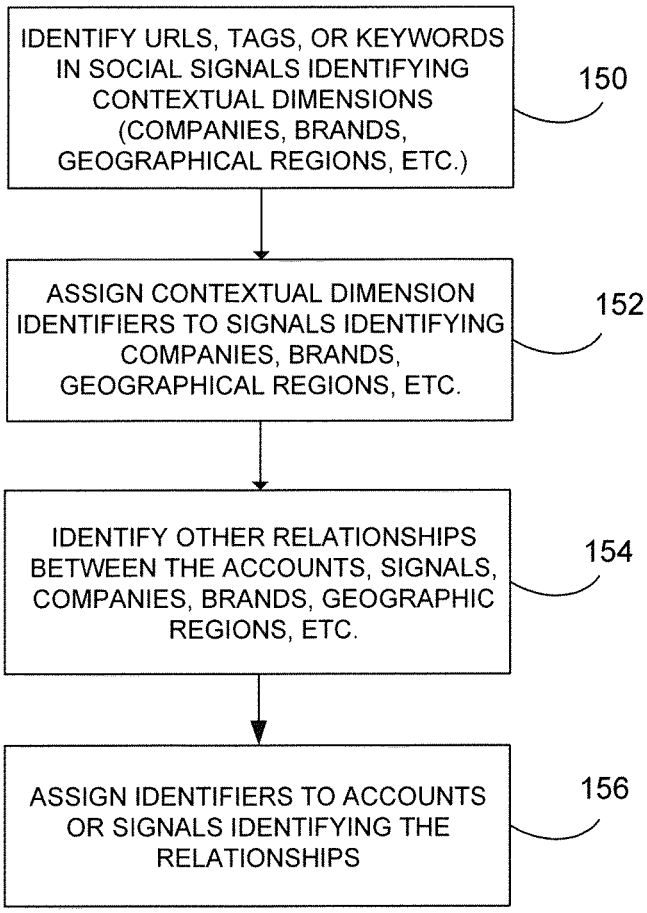
IDENTIFY URLS, TAGS, OR KEYWORDS IN SOCIAL SIGNALS IDENTIFYING CONTEXTUAL DIMENSIONS (COMPANIES, BRANDS, GEOGRAPHICAL REGIONS, ETC.)
150
ASSIGN CONTEXTUAL DIMENSION IDENTIFIERS TO SIGNALS IDENTIFYING COMPANIES, BRANDS, GEOGRAPHICAL REGIONS, ETC.
152
IDENTIFY OTHER RELATIONSHIPS BETWEEN THE ACCOUNTS, SIGNALS, COMPANIES, BRANDS, GEOGRAPHIC REGIONS, ETC.
154
ASSIGN IDENTIFIERS TO ACCOUNTS OR SIGNALS IDENTIFYING THE RELATIONSHIPS
156

FIG. 3

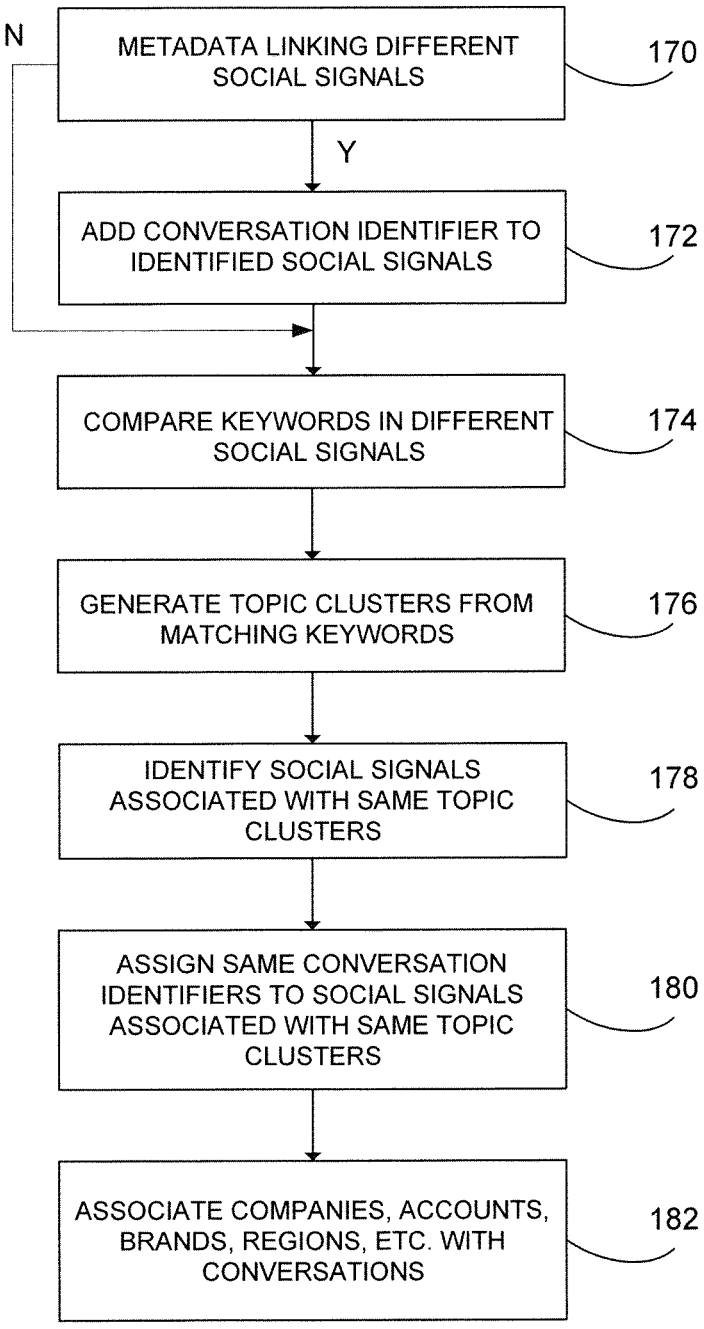
N
METADATA LINKING DIFFERENT SOCIAL SIGNALS
170
Y
ADD CONVERSATION IDENTIFIER TO IDENTIFIED SOCIAL SIGNALS
172
COMPARE KEYWORDS IN DIFFERENT SOCIAL SIGNALS
174
GENERATE TOPIC CLUSTERS FROM MATCHING KEYWORDS
176
IDENTIFY SOCIAL SIGNALS ASSOCIATED WITH SAME TOPIC CLUSTERS
178
ASSIGN SAME CONVERSATION IDENTIFIERS TO SOCIAL SIGNALS ASSOCIATED WITH SAME TOPIC CLUSTERS
180
ASSOCIATE COMPANIES, ACCOUNTS, BRANDS, REGIONS, ETC. WITH CONVERSATIONS
182

FIG. 4

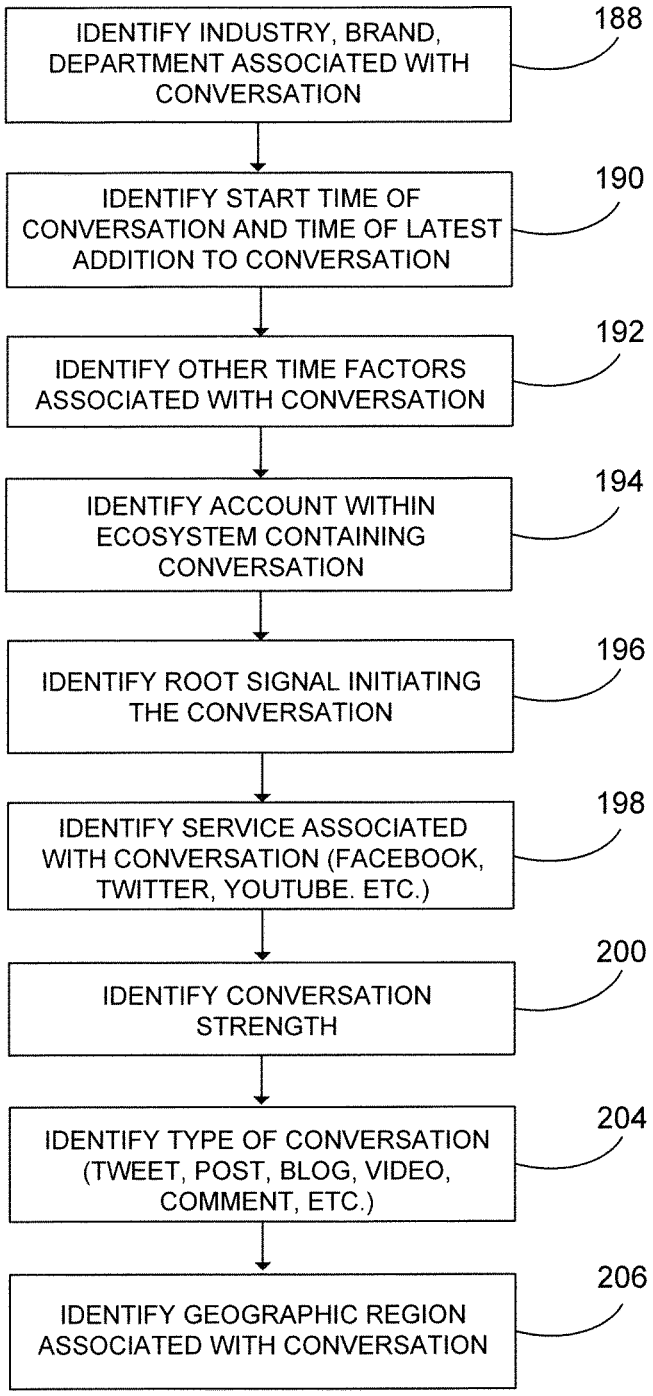
IDENTIFY INDUSTRY, BRAND, DEPARTMENT ASSOCIATED WITH CONVERSATION
188
IDENTIFY START TIME OF CONVERSATION AND TIME OF LATEST ADDITION TO CONVERSATION
190
IDENTIFY OTHER TIME FACTORS ASSOCIATED WITH CONVERSATION
192
IDENTIFY ACCOUNT WITHIN ECOSYSTEM CONTAINING CONVERSATION
194
IDENTIFY ROOT SIGNAL INITIATING THE CONVERSATION
196
IDENTIFY SERVICE ASSOCIATED WITH CONVERSATION (FACEBOOK, TWITTER, YOUTUBE. ETC.)
198
IDENTIFY CONVERSATION STRENGTH
200
IDENTIFY TYPE OF CONVERSATION (TWEET, POST, BLOG, VIDEO, COMMENT, ETC.)
204
IDENTIFY GEOGRAPHIC REGION ASSOCIATED WITH CONVERSATION
206

FIG. 5

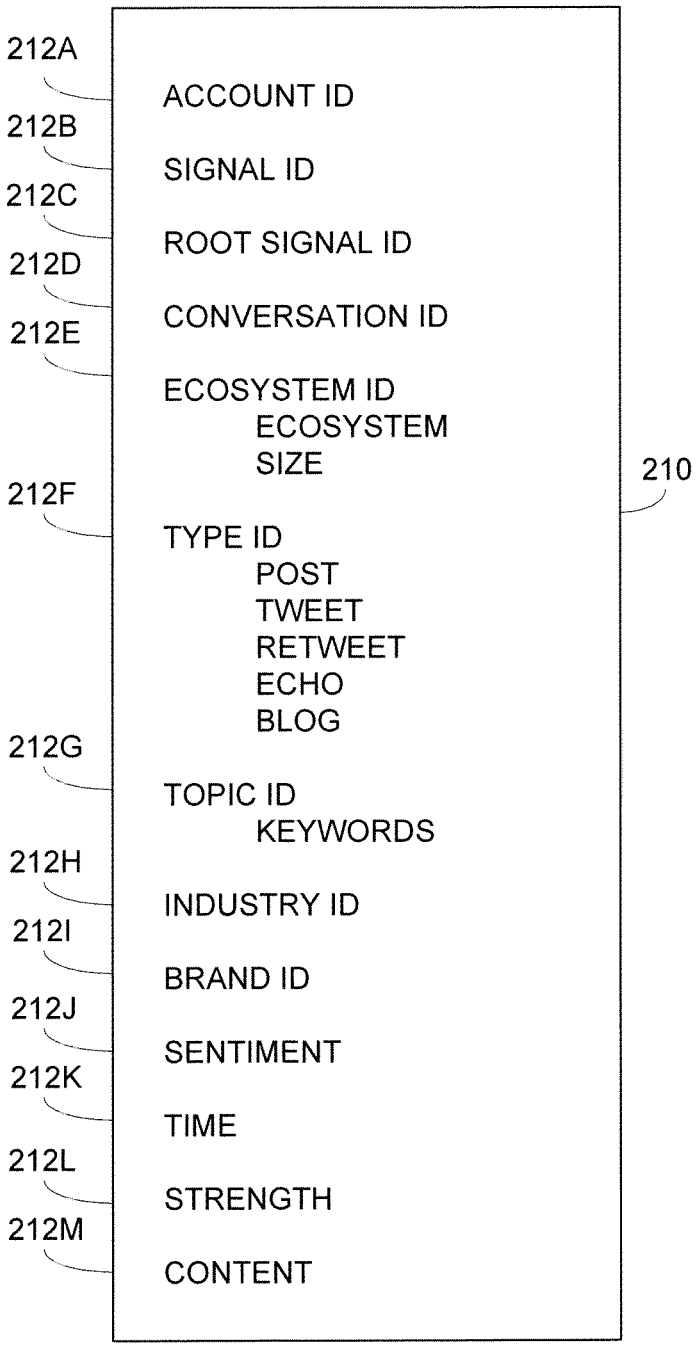
212A
ACCOUNT ID
212B
SIGNAL ID
212C
ROOT SIGNAL ID
212D
CONVERSATION ID
212E
ECOSYSTEM ID
ECOSYSTEM
SIZE
210
212F
TYPE ID
POST
TWEET
RETWEET
ECHO
BLOG
212G
TOPIC ID
KEYWORDS
212H
INDUSTRY ID
212I
BRAND ID
212J
SENTIMENT
212K
TIME
212L
STRENGTH
212M
CONTENT

FIG. 6

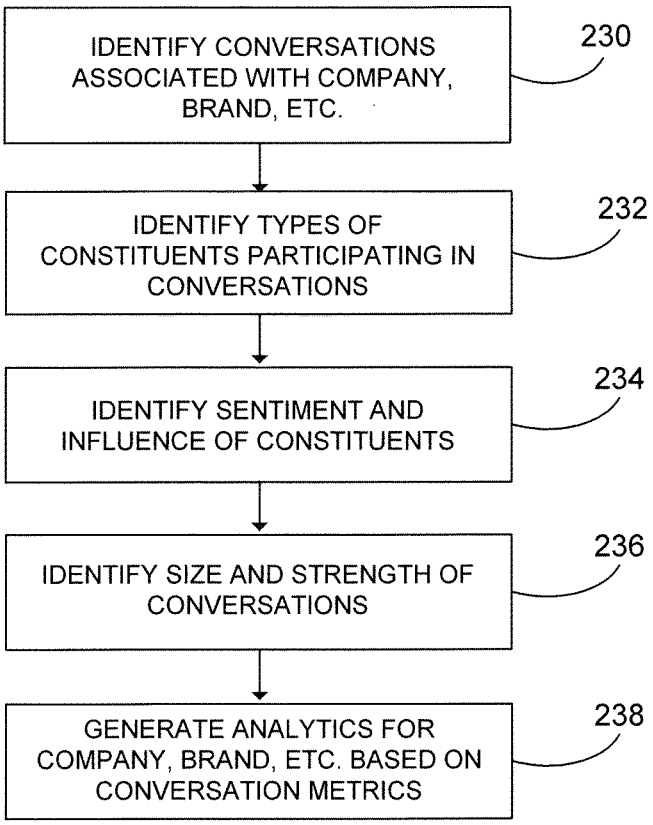
IDENTIFY CONVERSATIONS ASSOCIATED WITH COMPANY, BRAND, ETC.
230
IDENTIFY TYPES OF CONSTITUENTS PARTICIPATING IN CONVERSATIONS
232
IDENTIFY SENTIMENT AND INFLUENCE OF CONSTITUENTS
234
IDENTIFY SIZE AND STRENGTH OF CONVERSATIONS
236
GENERATE ANALYTICS FOR COMPANY, BRAND, ETC. BASED ON CONVERSATION METRICS
238

FIG. 7

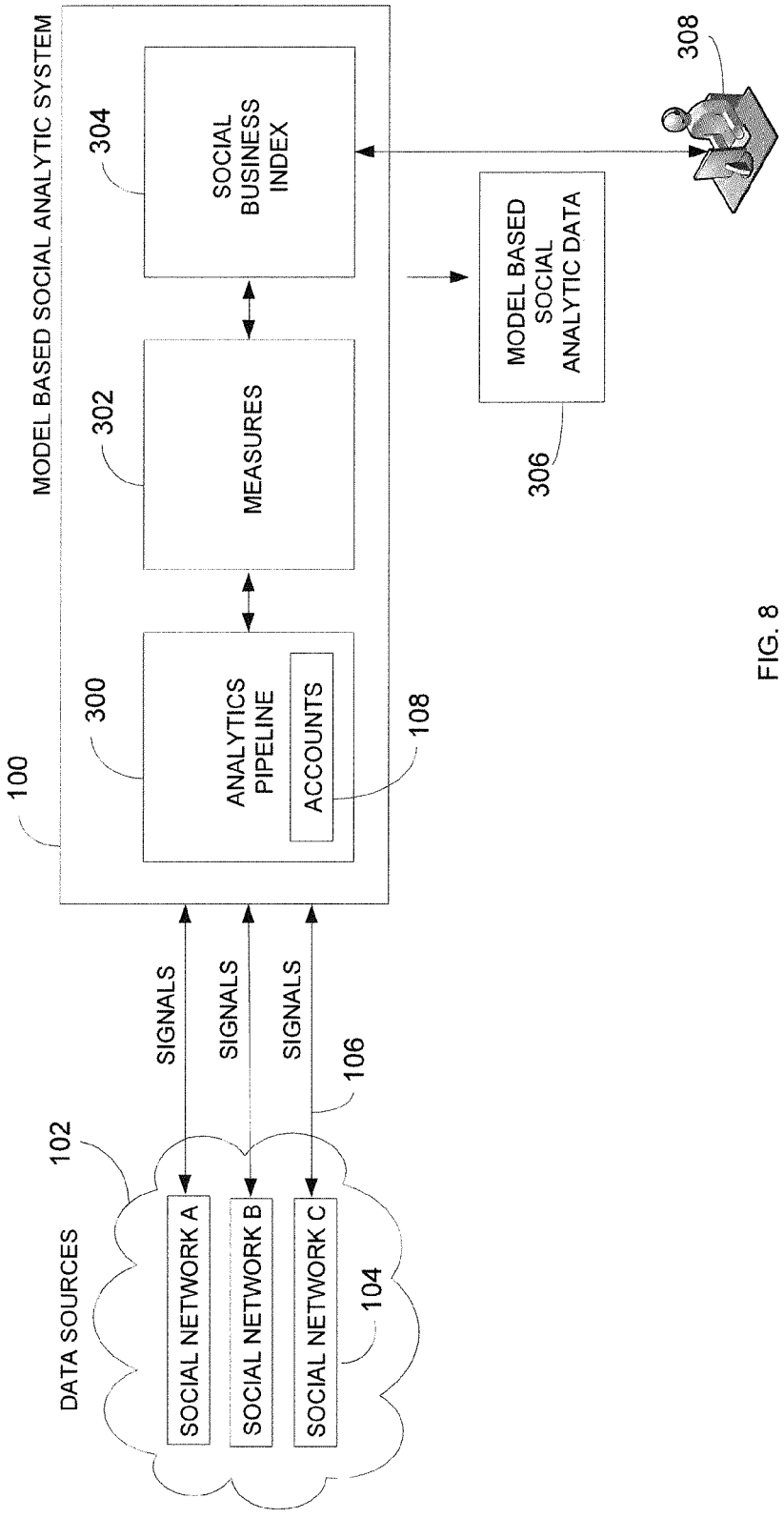
MODEL BASED SOCIAL ANALYTIC SYSTEM
100
ANALYTICS PIPELINE
300
ACCOUNTS
108
MEASURES
302
SOCIAL BUSINESS INDEX
304
MODEL BASED SOCIAL ANALYTIC DATA
306
308
SIGNALS
SIGNALS
SIGNALS
106
DATA SOURCES
102
SOCIAL NETWORK A
SOCIAL NETWORK B
SOCIAL NETWORK C
104

FIG. 8

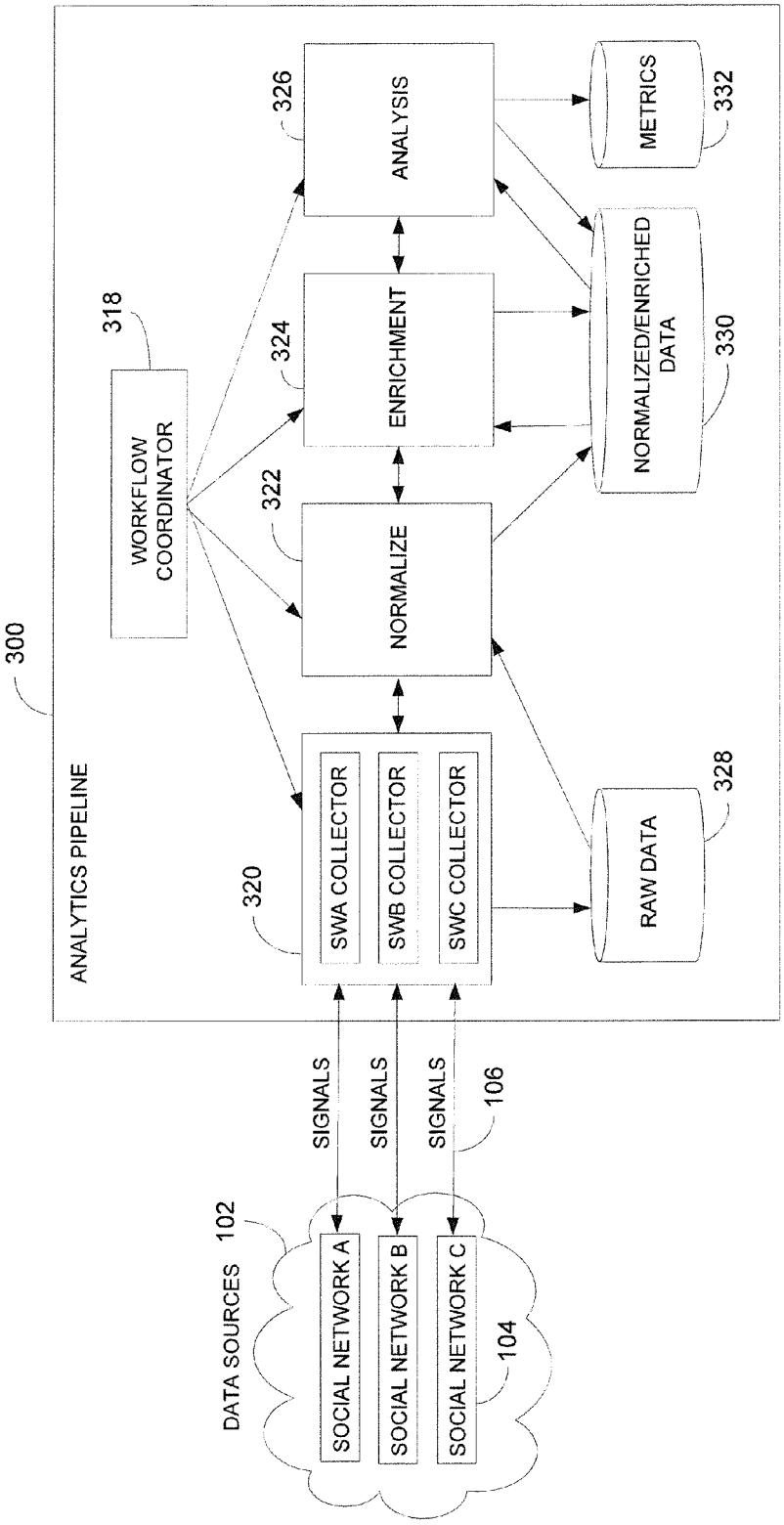
300
ANALYTICS PIPELINE
318
WORKFLOW COORDINATOR
326
ANALYSIS
324
ENRICHMENT
322
NORMALIZE
320
SWA COLLECTOR
SWB COLLECTOR
SWC COLLECTOR
METRICS
332
NORMALIZED/ENRICHED DATA
330
RAW DATA
328
SIGNALS
SIGNALS
SIGNALS
106
102
DATA SOURCES
SOCIAL NETWORK A
SOCIAL NETWORK B
SOCIAL NETWORK C
104

FIG. 9

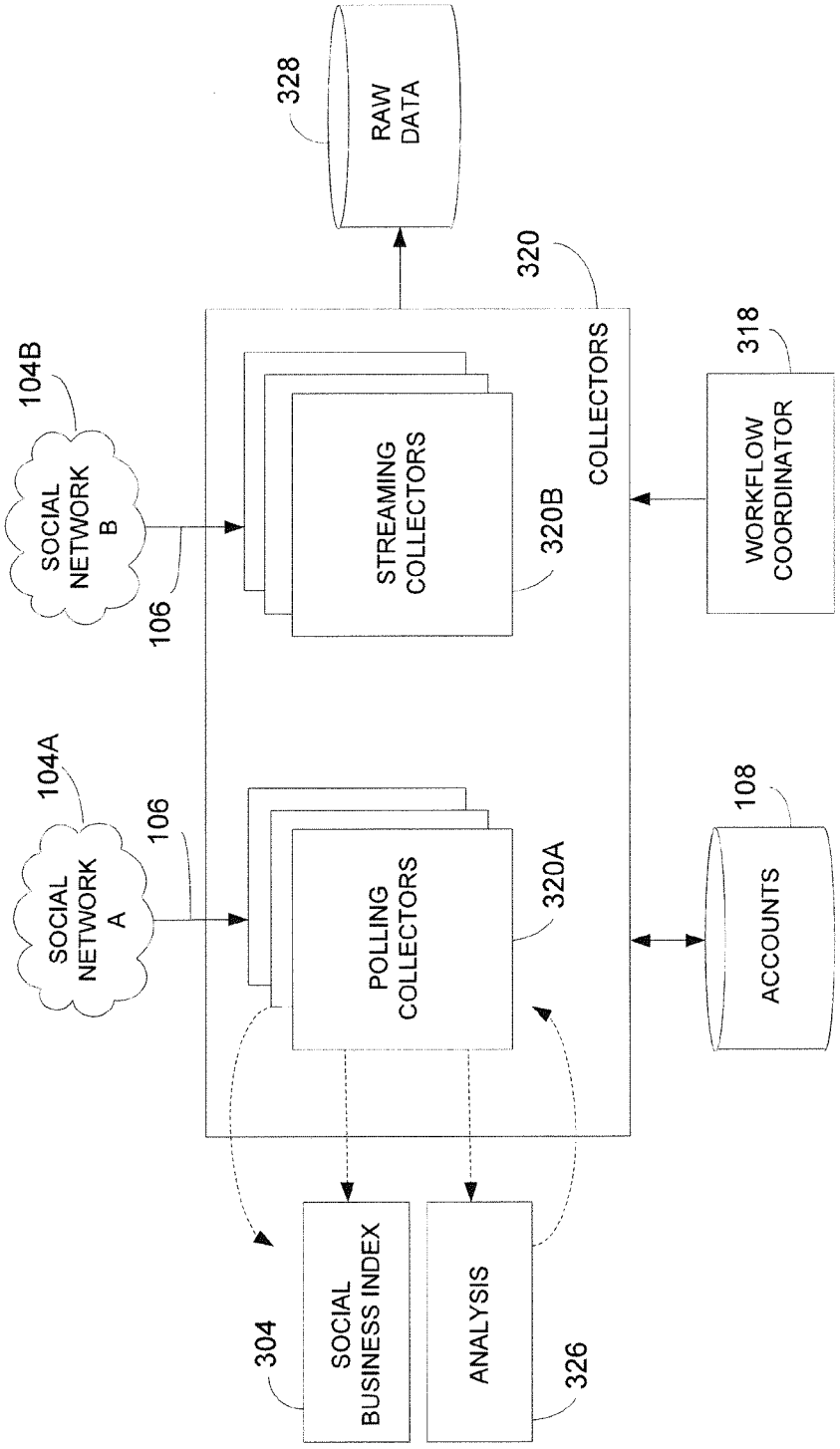
328
RAW DATA
320
COLLECTORS
104B
SOCIAL NETWORK B
106
STREAMING COLLECTORS
320B
318
WORKFLOW COORDINATOR
104A
SOCIAL NETWORK A
106
POLLING COLLECTORS
320A
108
ACCOUNTS
304
SOCIAL BUSINESS INDEX
ANALYSIS
326

FIG. 10

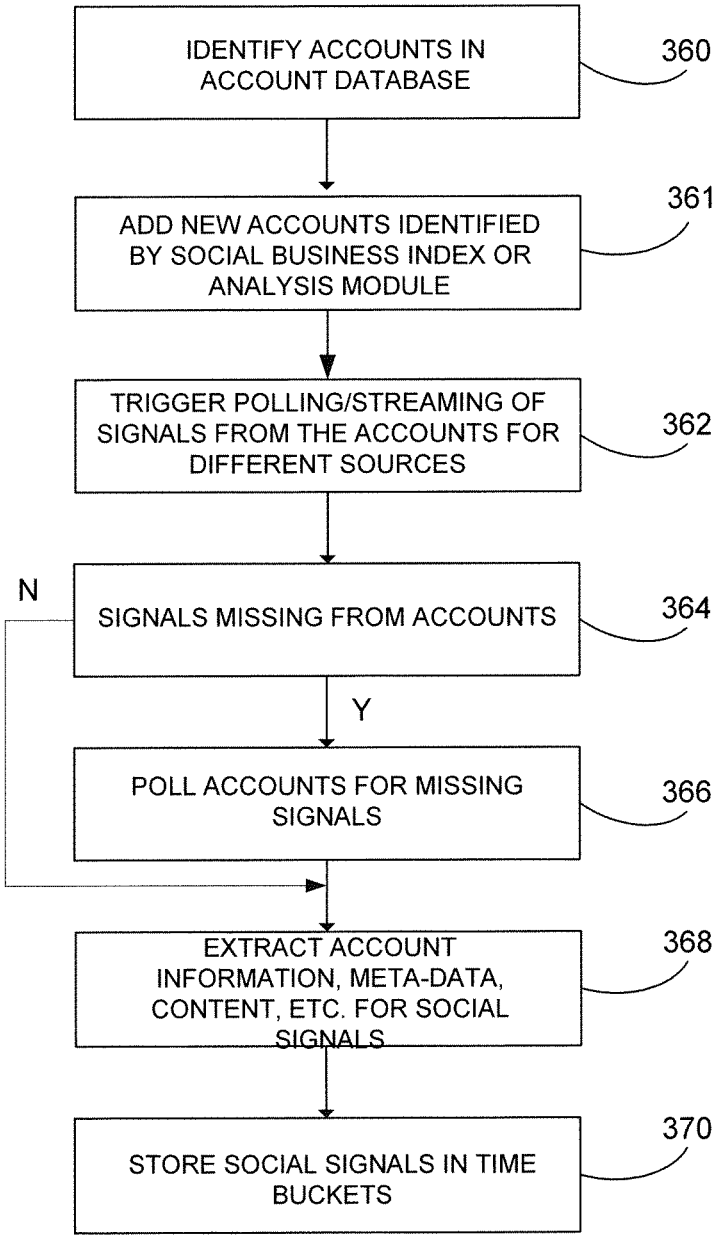
IDENTIFY ACCOUNTS IN ACCOUNT DATABASE
360
ADD NEW ACCOUNTS IDENTIFIED BY SOCIAL BUSINESS INDEX OR ANALYSIS MODULE
361
TRIGGER POLLING/STREAMING OF SIGNALS FROM THE ACCOUNTS FOR DIFFERENT SOURCES
362
N
SIGNALS MISSING FROM ACCOUNTS
364
Y
POLL ACCOUNTS FOR MISSING SIGNALS
366
EXTRACT ACCOUNT INFORMATION, META-DATA, CONTENT, ETC. FOR SOCIAL SIGNALS
368
STORE SOCIAL SIGNALS IN TIME BUCKETS
370

FIG. 11

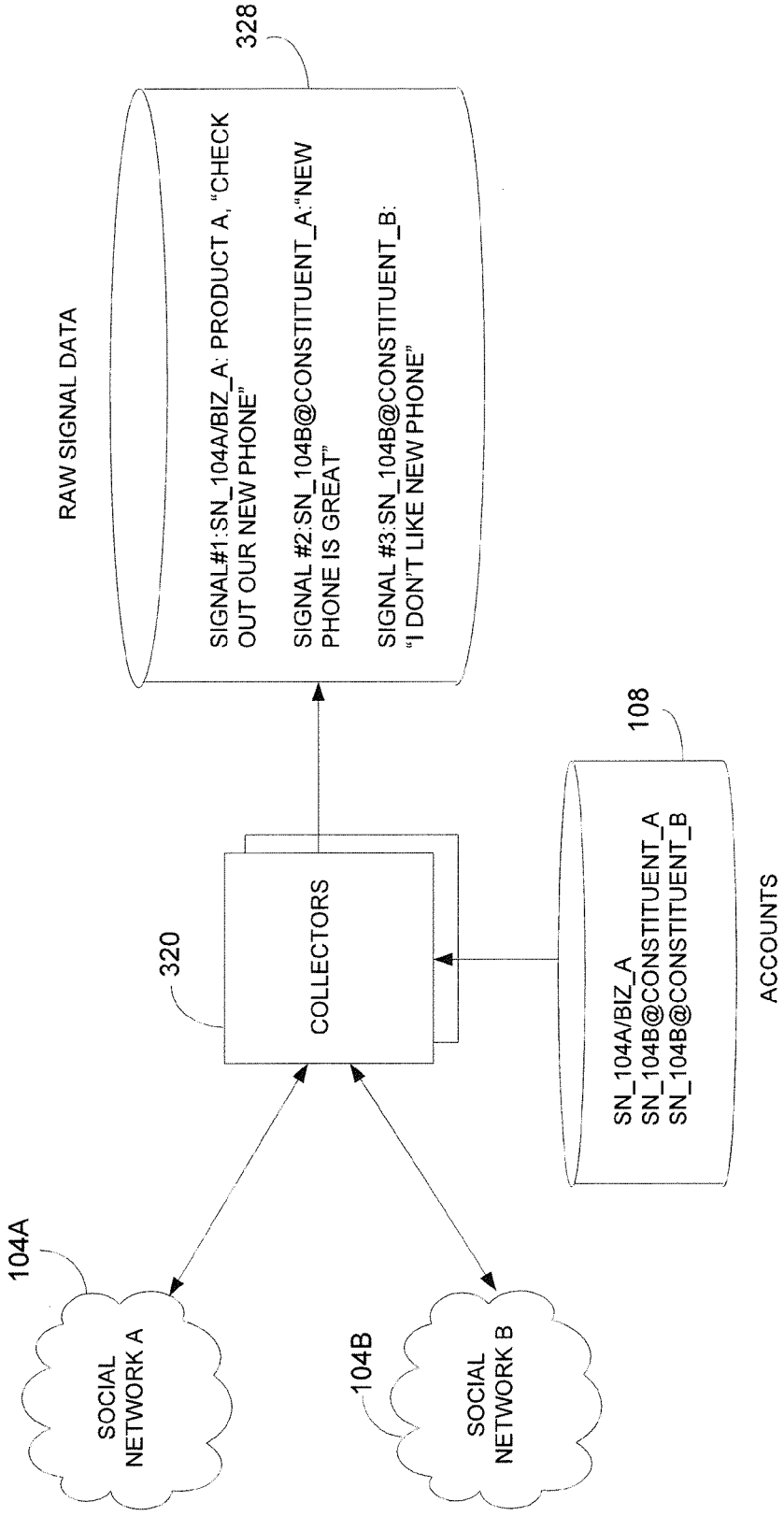
328
RAW SIGNAL DATA
SIGNAL#1:SN_104A/BIZ_A: PRODUCT A, "CHECK OUT OUR NEW PHONE"
SIGNAL #2:SN_104B@CONSTITUENT_A:"NEW PHONE IS GREAT"
SIGNAL #3:SN_104B@CONSTITUENT_B: "I DON'T LIKE NEW PHONE"
108
SN_104A/BIZ_A
SN_104B@CONSTITUENT_A
SN_104B@CONSTITUENT_B
ACCOUNTS
320
COLLECTORS
104A
SOCIAL NETWORK A
104B
SOCIAL NETWORK B

FIG. 12

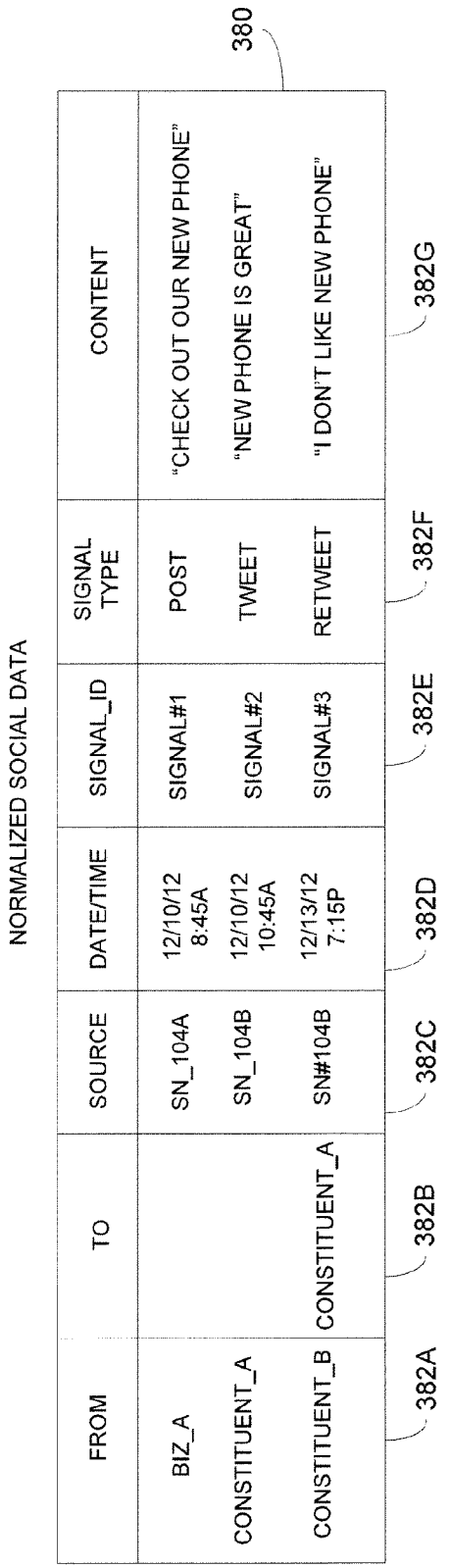
NORMALIZED SOCIAL DATA
FROM
TO
SOURCE
DATE/TIME
SIGNAL_ID
SIGNAL TYPE
CONTENT
BIZ_A
SN_104A
12/10/12 8:45A
SIGNAL#1
POST
"CHECK OUT OUR NEW PHONE"
CONSTITUENT_A
SN_104B
12/10/12 10:45A
SIGNAL#2
TWEET
"NEW PHONE IS GREAT"
CONSTITUENT_B
CONSTITUENT_A
SN#104B
12/13/12 7:15P
SIGNAL#3
RETWEET
"I DON'T LIKE NEW PHONE"
380
382A
382B
382C
382D
382E
382F
382G

FIG. 13

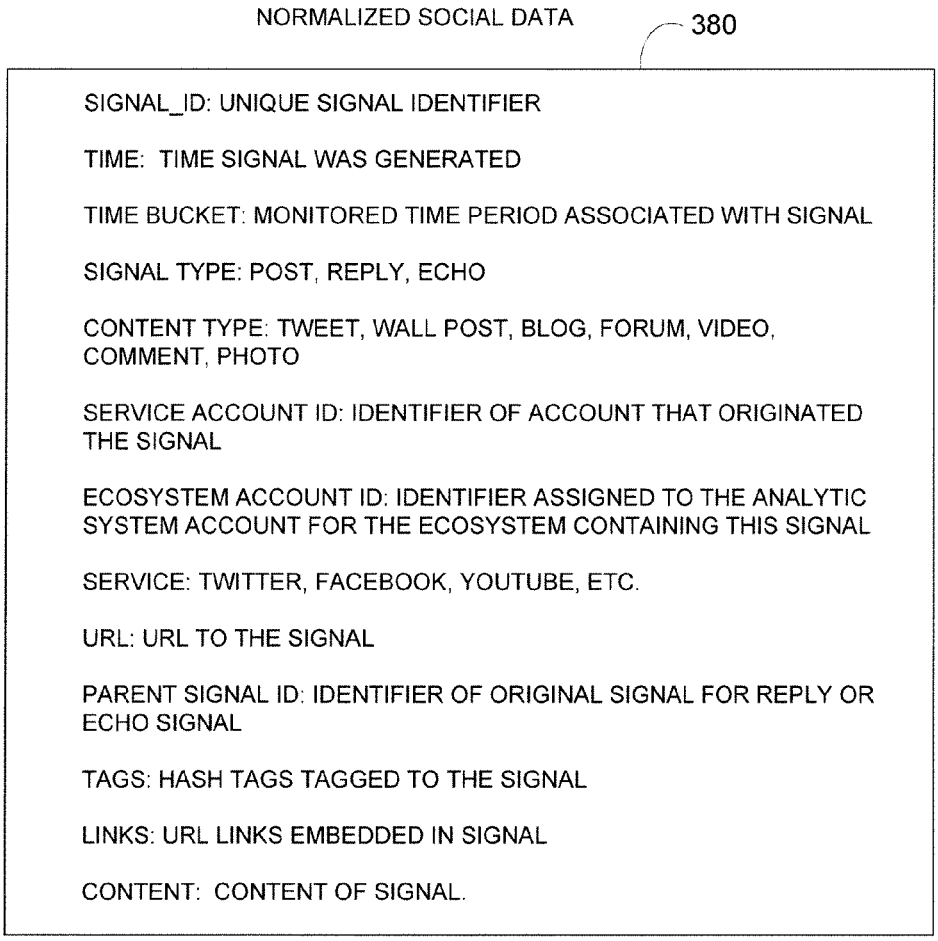
NORMALIZED SOCIAL DATA
380
SIGNAL_ID: UNIQUE SIGNAL IDENTIFIER
TIME: TIME SIGNAL WAS GENERATED
TIME BUCKET: MONITORED TIME PERIOD ASSOCIATED WITH SIGNAL
SIGNAL TYPE: POST, REPLY, ECHO
CONTENT TYPE: TWEET, WALL POST, BLOG, FORUM, VIDEO, COMMENT, PHOTO
SERVICE ACCOUNT ID: IDENTIFIER OF ACCOUNT THAT ORIGINATED THE SIGNAL
ECOSYSTEM ACCOUNT ID: IDENTIFIER ASSIGNED TO THE ANALYTIC SYSTEM ACCOUNT FOR THE ECOSYSTEM CONTAINING THIS SIGNAL
SERVICE: TWITTER, FACEBOOK, YOUTUBE, ETC.
URL: URL TO THE SIGNAL
PARENT SIGNAL ID: IDENTIFIER OF ORIGINAL SIGNAL FOR REPLY OR ECHO SIGNAL
TAGS: HASH TAGS TAGGED TO THE SIGNAL
LINKS: URL LINKS EMBEDDED IN SIGNAL
CONTENT: CONTENT OF SIGNAL.

FIG. 14

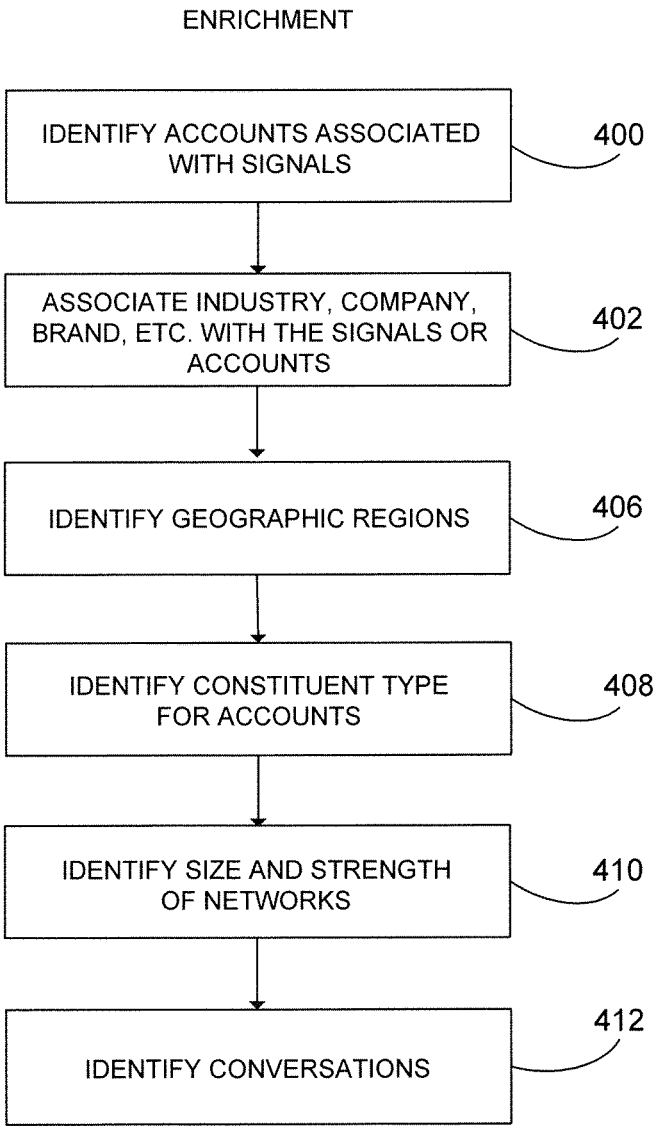
ENRICHMENT
IDENTIFY ACCOUNTS ASSOCIATED WITH SIGNALS
400
ASSOCIATE INDUSTRY, COMPANY, BRAND, ETC. WITH THE SIGNALS OR ACCOUNTS
402
IDENTIFY GEOGRAPHIC REGIONS
406
IDENTIFY CONSTITUENT TYPE FOR ACCOUNTS
408
IDENTIFY SIZE AND STRENGTH OF NETWORKS
410
IDENTIFY CONVERSATIONS
412

FIG. 15

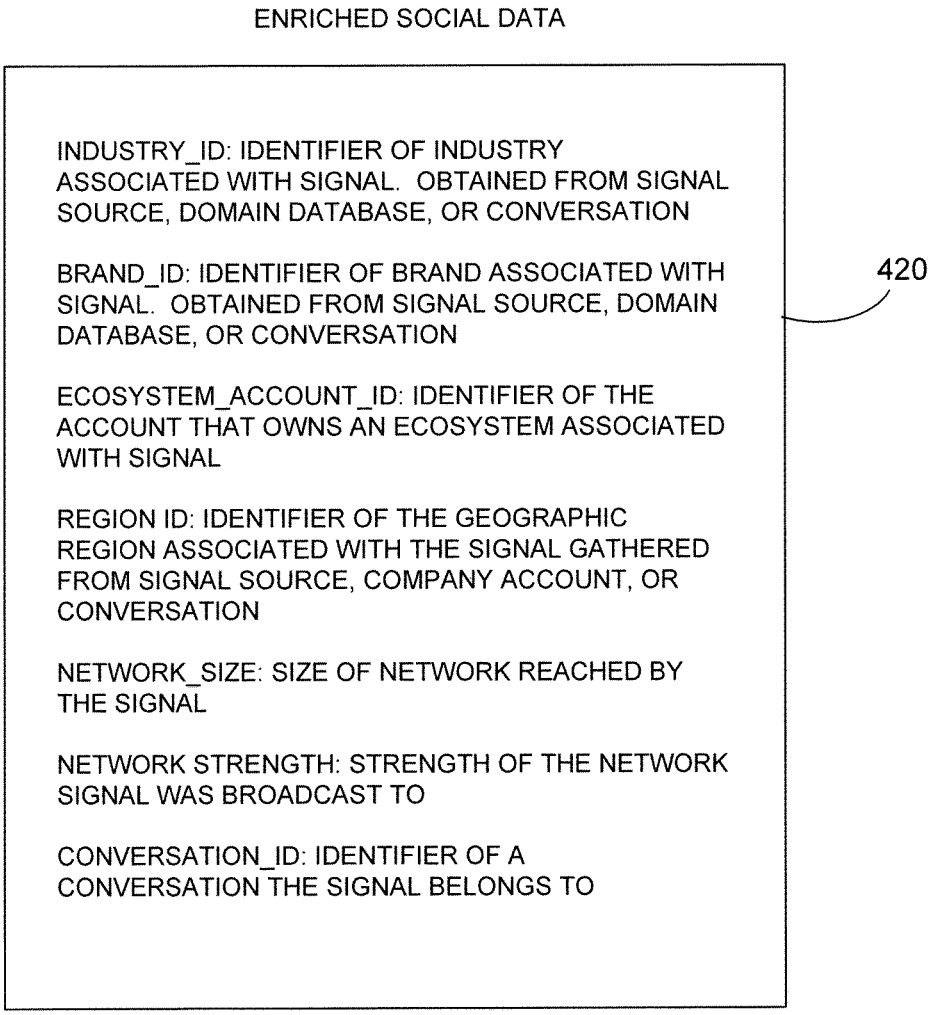
ENRICHED SOCIAL DATA
INDUSTRY_ID: IDENTIFIER OF INDUSTRY ASSOCIATED WITH SIGNAL. OBTAINED FROM SIGNAL SOURCE, DOMAIN DATABASE, OR CONVERSATION
BRAND_ID: IDENTIFIER OF BRAND ASSOCIATED WITH SIGNAL. OBTAINED FROM SIGNAL SOURCE, DOMAIN DATABASE, OR CONVERSATION
420
ECOSYSTEM_ACCOUNT_ID: IDENTIFIER OF THE ACCOUNT THAT OWNS AN ECOSYSTEM ASSOCIATED WITH SIGNAL
REGION ID: IDENTIFIER OF THE GEOGRAPHIC REGION ASSOCIATED WITH THE SIGNAL GATHERED FROM SIGNAL SOURCE, COMPANY ACCOUNT, OR CONVERSATION
NETWORK_SIZE: SIZE OF NETWORK REACHED BY THE SIGNAL
NETWORK STRENGTH: STRENGTH OF THE NETWORK SIGNAL WAS BROADCAST TO
CONVERSATION_ID: IDENTIFIER OF A CONVERSATION THE SIGNAL BELONGS TO

FIG. 16

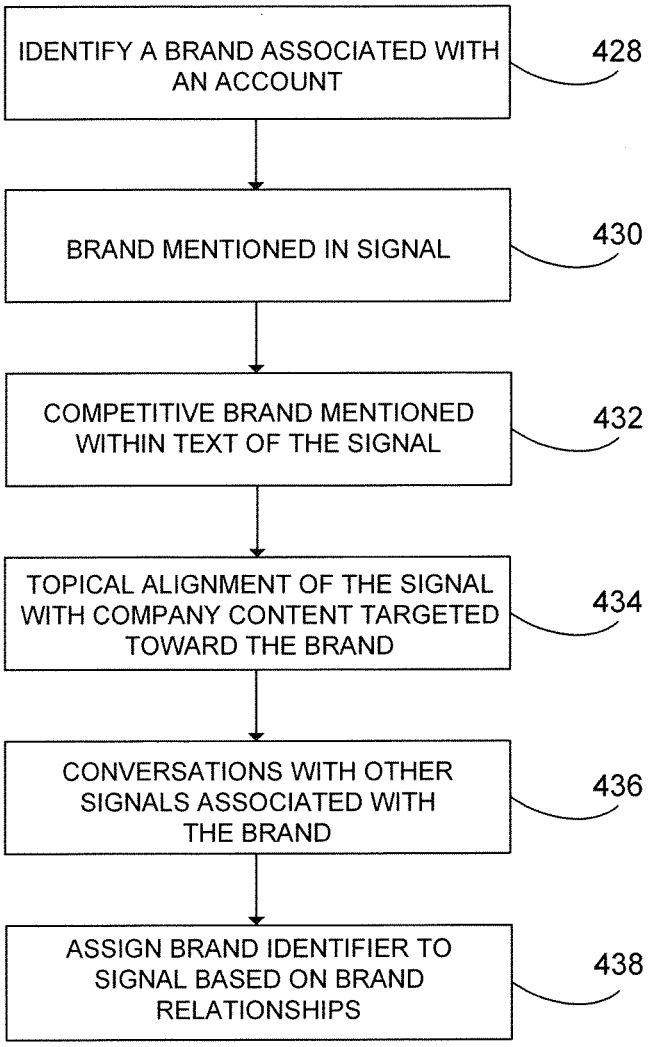
IDENTIFY A BRAND ASSOCIATED WITH AN ACCOUNT
428
BRAND MENTIONED IN SIGNAL
430
COMPETITIVE BRAND MENTIONED WITHIN TEXT OF THE SIGNAL
432
TOPICAL ALIGNMENT OF THE SIGNAL WITH COMPANY CONTENT TARGETED TOWARD THE BRAND
434
CONVERSATIONS WITH OTHER SIGNALS ASSOCIATED WITH THE BRAND
436
ASSIGN BRAND IDENTIFIER TO SIGNAL BASED ON BRAND RELATIONSHIPS
438

FIG. 17

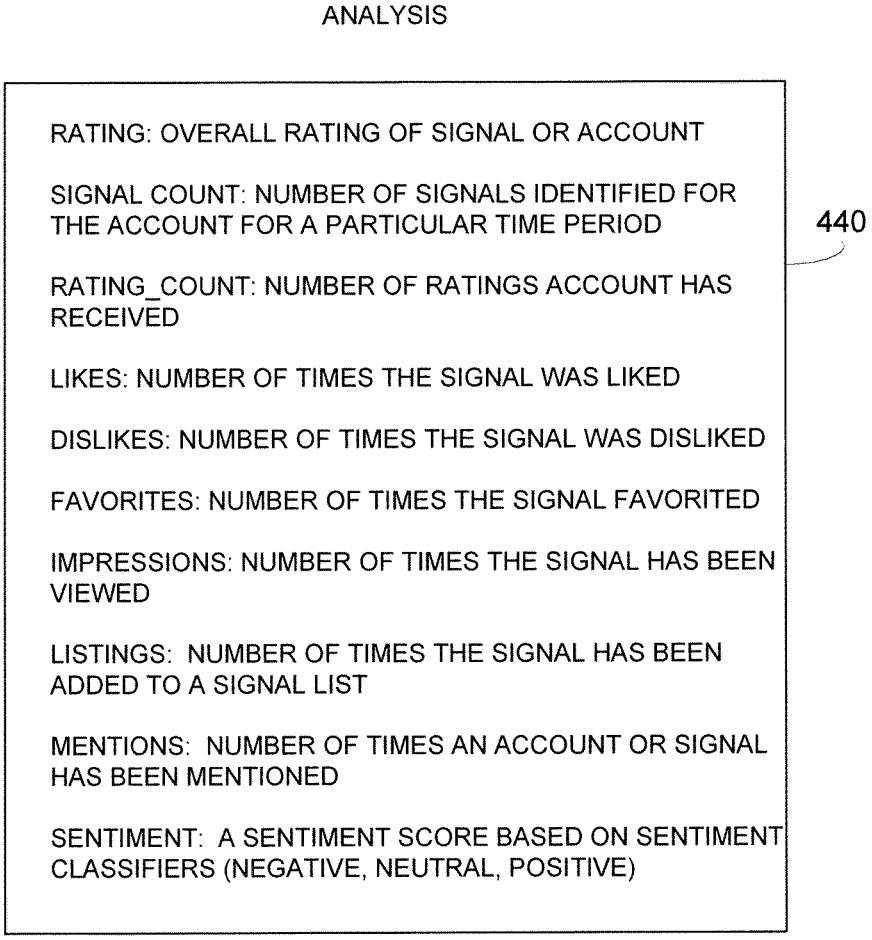
ANALYSIS
RATING: OVERALL RATING OF SIGNAL OR ACCOUNT
SIGNAL COUNT: NUMBER OF SIGNALS IDENTIFIED FOR THE ACCOUNT FOR A PARTICULAR TIME PERIOD
RATING_COUNT: NUMBER OF RATINGS ACCOUNT HAS RECEIVED
LIKES: NUMBER OF TIMES THE SIGNAL WAS LIKED
DISLIKES: NUMBER OF TIMES THE SIGNAL WAS DISLIKED
FAVORITES: NUMBER OF TIMES THE SIGNAL FAVORITED
IMPRESSIONS: NUMBER OF TIMES THE SIGNAL HAS BEEN VIEWED
LISTINGS: NUMBER OF TIMES THE SIGNAL HAS BEEN ADDED TO A SIGNAL LIST
MENTIONS: NUMBER OF TIMES AN ACCOUNT OR SIGNAL HAS BEEN MENTIONED
SENTIMENT: A SENTIMENT SCORE BASED ON SENTIMENT CLASSIFIERS (NEGATIVE, NEUTRAL, POSITIVE)
440

FIG. 18

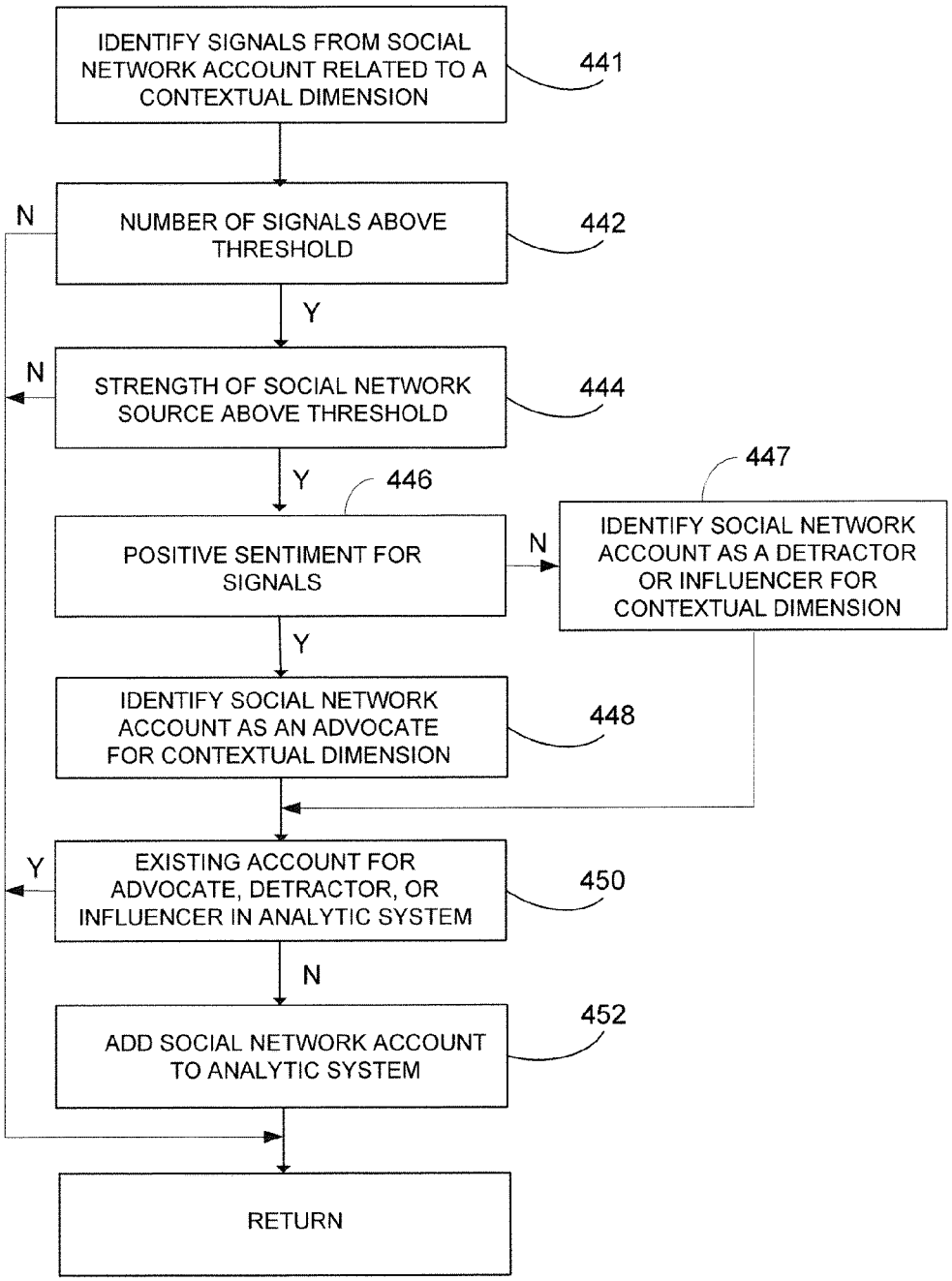
IDENTIFY SIGNALS FROM SOCIAL NETWORK ACCOUNT RELATED TO A CONTEXTUAL DIMENSION
441
NUMBER OF SIGNALS ABOVE THRESHOLD
442
N
Y
STRENGTH OF SOCIAL NETWORK SOURCE ABOVE THRESHOLD
444
N
Y
446
447
POSITIVE SENTIMENT FOR SIGNALS
N
IDENTIFY SOCIAL NETWORK ACCOUNT AS A DETRACTOR OR INFLUENCER FOR CONTEXTUAL DIMENSION
Y
IDENTIFY SOCIAL NETWORK ACCOUNT AS AN ADVOCATE FOR CONTEXTUAL DIMENSION
448
EXISTING ACCOUNT FOR ADVOCATE, DETRACTOR, OR INFLUENCER IN ANALYTIC SYSTEM
450
Y
N
ADD SOCIAL NETWORK ACCOUNT TO ANALYTIC SYSTEM
452
RETURN

FIG. 19

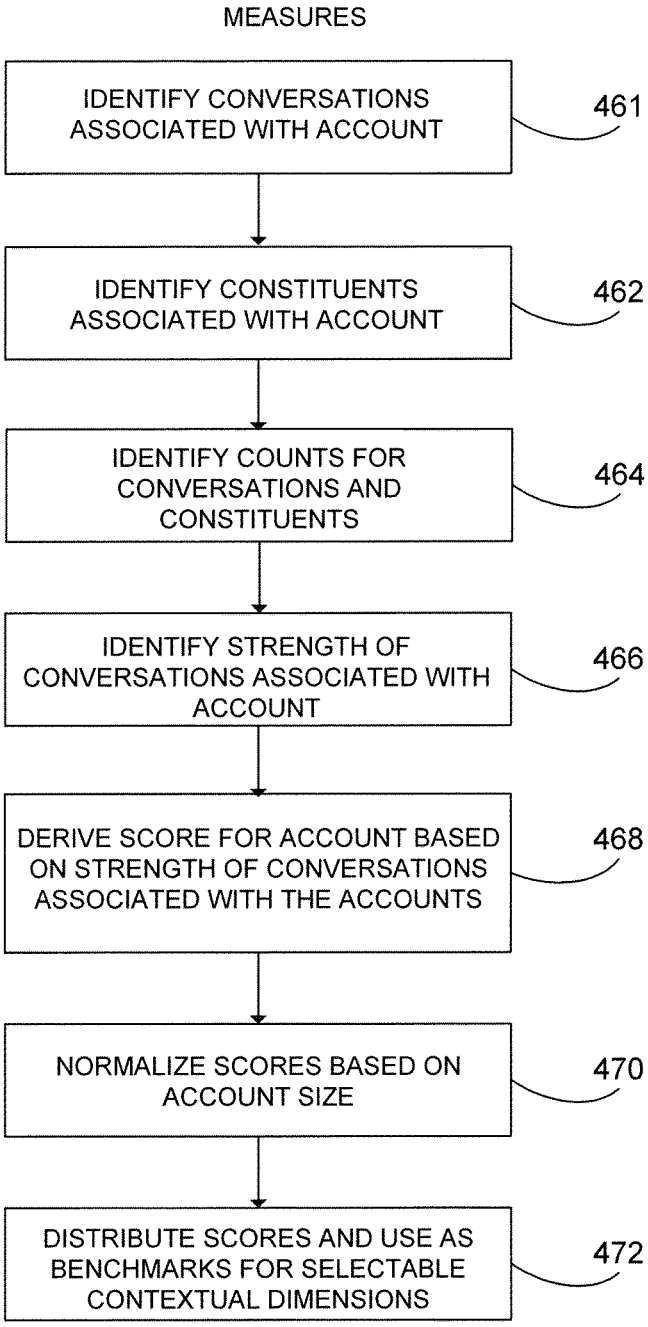
MEASURES
IDENTIFY CONVERSATIONS ASSOCIATED WITH ACCOUNT
461
IDENTIFY CONSTITUENTS ASSOCIATED WITH ACCOUNT
462
IDENTIFY COUNTS FOR CONVERSATIONS AND CONSTITUENTS
464
IDENTIFY STRENGTH OF CONVERSATIONS ASSOCIATED WITH ACCOUNT
466
DERIVE SCORE FOR ACCOUNT BASED ON STRENGTH OF CONVERSATIONS ASSOCIATED WITH THE ACCOUNTS
468
NORMALIZE SCORES BASED ON ACCOUNT SIZE
470
DISTRIBUTE SCORES AND USE AS BENCHMARKS FOR SELECTABLE CONTEXTUAL DIMENSIONS
472

FIG. 20

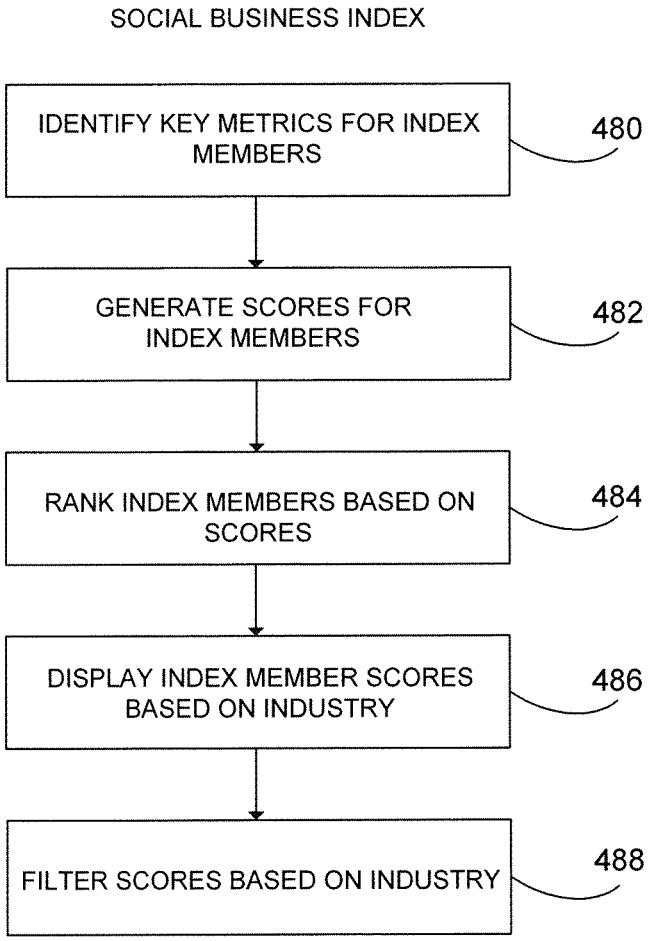
SOCIAL BUSINESS INDEX
IDENTIFY KEY METRICS FOR INDEX MEMBERS
480
GENERATE SCORES FOR INDEX MEMBERS
482
RANK INDEX MEMBERS BASED ON SCORES
484
DISPLAY INDEX MEMBER SCORES BASED ON INDUSTRY
486
FILTER SCORES BASED ON INDUSTRY
488

FIG. 21

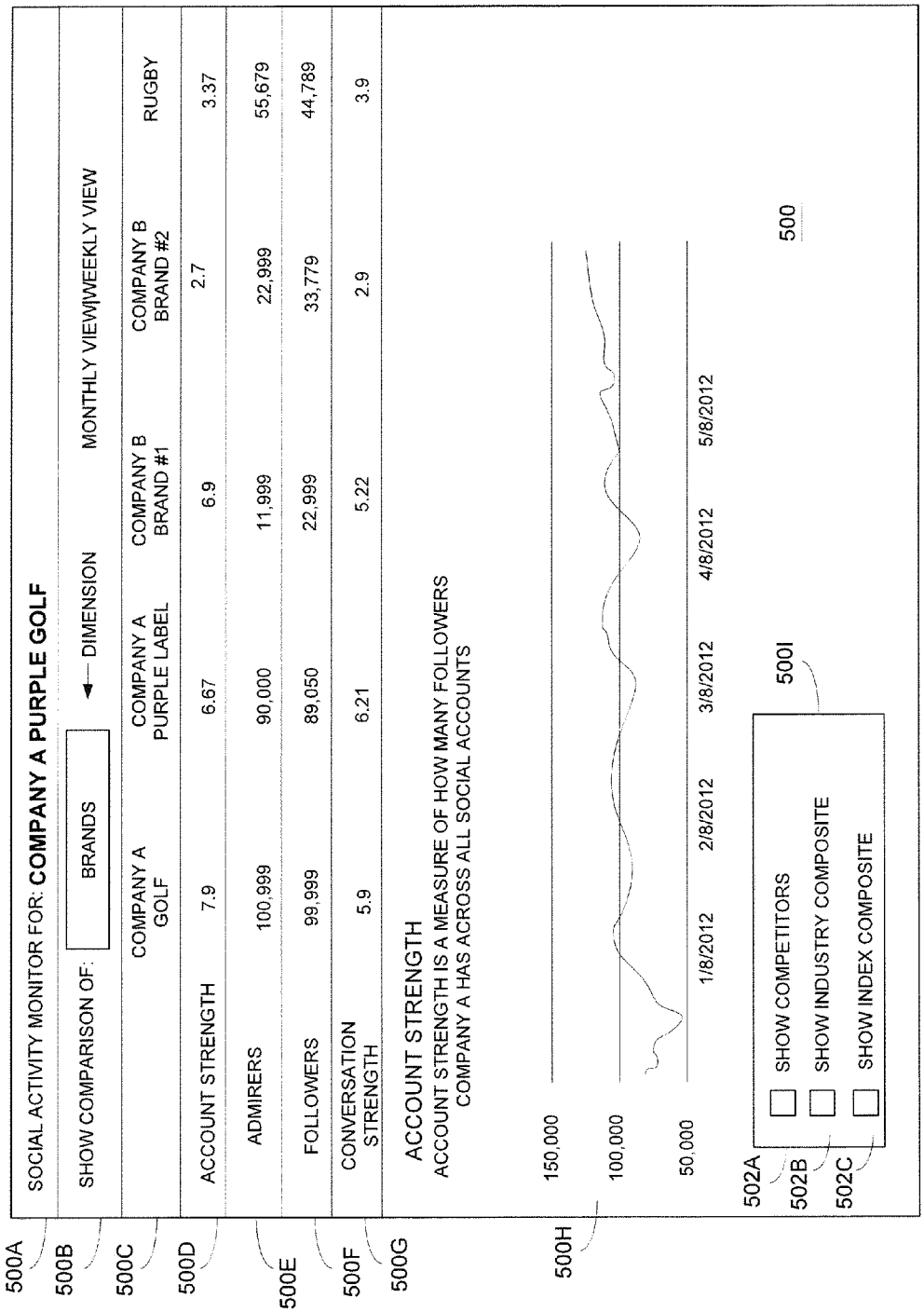
500A
SOCIAL ACTIVITY MONITOR FOR: COMPANY A PURPLE GOLF
500B
SHOW COMPARISON OF:
BRANDS
DIMENSION
MONTHLY VIEW|WEEKLY VIEW
500C
COMPANY A GOLF
COMPANY A PURPLE LABEL
COMPANY B BRAND #1
COMPANY B BRAND #2
RUGBY
500D
ACCOUNT STRENGTH 7.9 6.67 6.9 2.7 3.37
500E
ADMIRERS 100,999 90,000 11,999 22,999 55,679
500F
FOLLOWERS 99,999 89,050 22,999 33,779 44,789
500G
CONVERSATION STRENGTH 5.9 6.21 5.22 2.9 3.9
ACCOUNT STRENGTH
ACCOUNT STRENGTH IS A MEASURE OF HOW MANY FOLLOWERS COMPANY A HAS ACROSS ALL SOCIAL ACCOUNTS
500H
150,000
100,000
50,000
1/8/2012
2/8/2012
3/8/2012
4/8/2012
5/8/2012
502A
SHOW COMPETITORS
502B
SHOW INDUSTRY COMPOSITE
502C
SHOW INDEX COMPOSITE
500I
500

FIG. 22

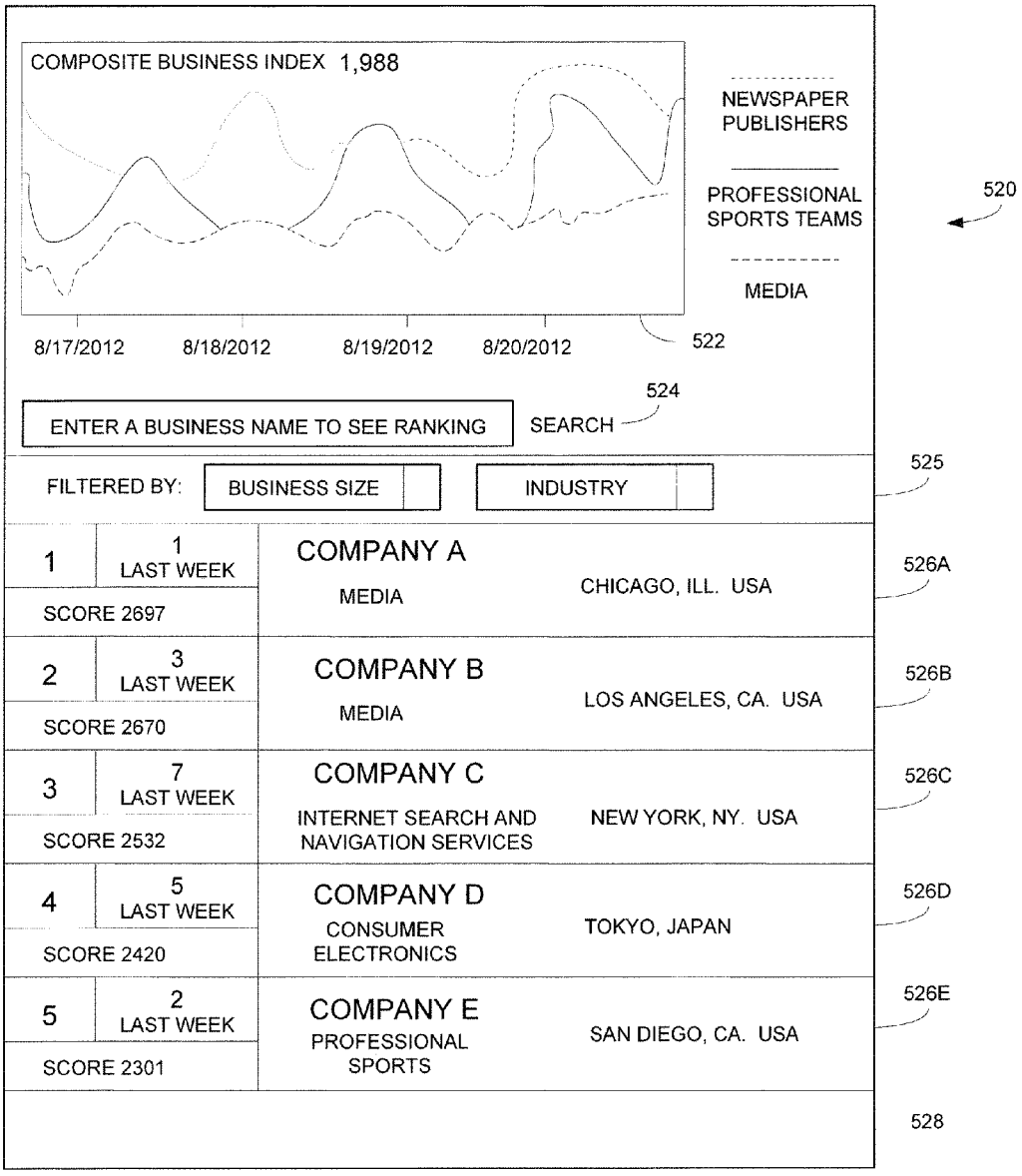
COMPOSITE BUSINESS INDEX 1,988
NEWSPAPER PUBLISHERS
PROFESSIONAL SPORTS TEAMS
MEDIA
520
8/17/2012
8/18/2012
8/19/2012
8/20/2012
522
524
ENTER A BUSINESS NAME TO SEE RANKING
SEARCH
525
FILTERED BY:
BUSINESS SIZE
INDUSTRY
1
1 LAST WEEK
SCORE 2697
COMPANY A
MEDIA
CHICAGO, ILL. USA
526A
2
3 LAST WEEK
SCORE 2670
COMPANY B
MEDIA
LOS ANGELES, CA. USA
526B
3
7 LAST WEEK
SCORE 2532
COMPANY C
INTERNET SEARCH AND NAVIGATION SERVICES
NEW YORK, NY. USA
526C
4
5 LAST WEEK
SCORE 2420
COMPANY D
CONSUMER ELECTRONICS
TOKYO, JAPAN
526D
5
2 LAST WEEK
SCORE 2301
COMPANY E
PROFESSIONAL SPORTS
SAN DIEGO, CA. USA
526E
528

FIG. 23

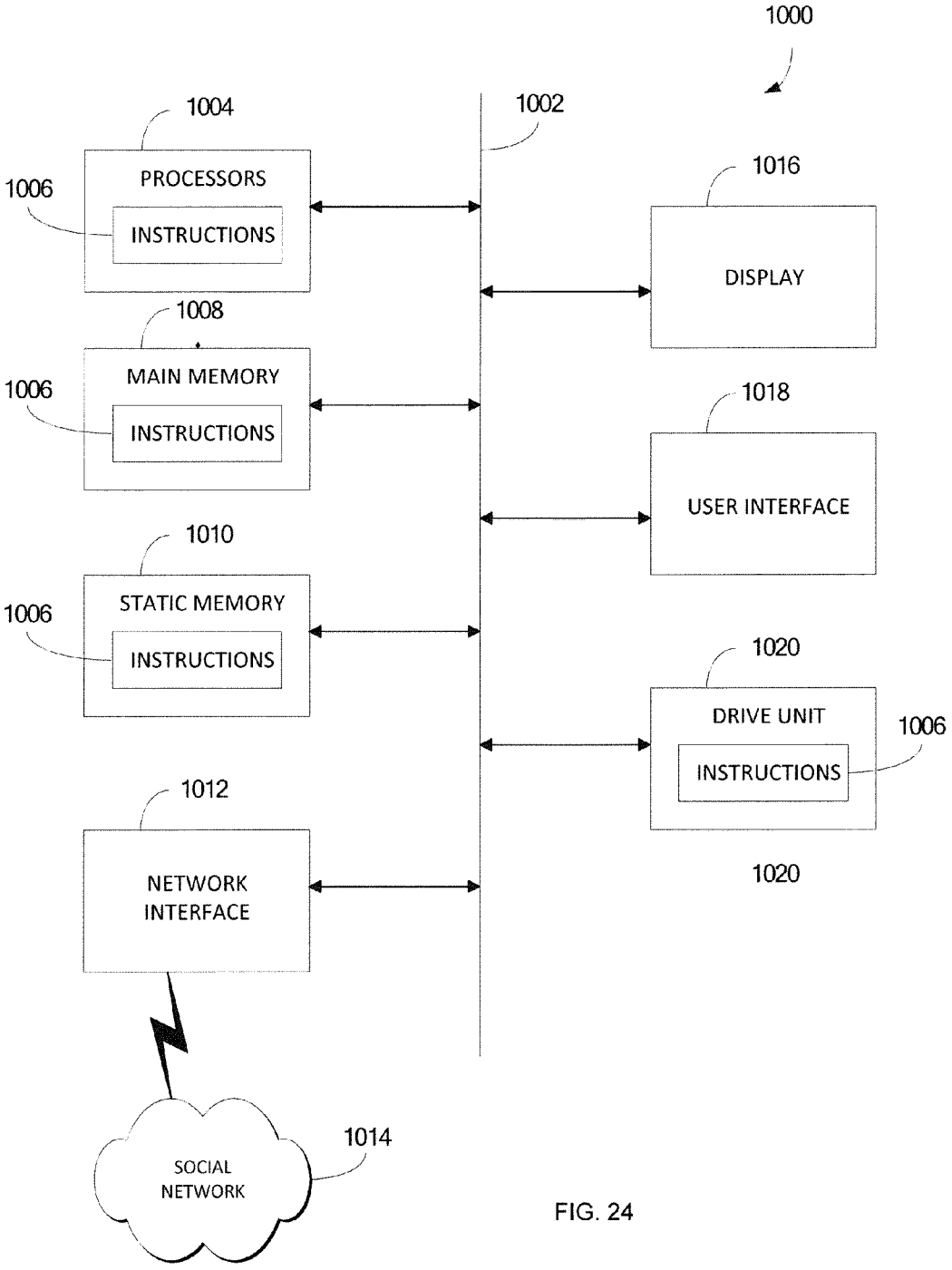
1000
1002
1004
PROCESSORS
1006
INSTRUCTIONS
1016
DISPLAY
1008
MAIN MEMORY
1006
INSTRUCTIONS
1018
USER INTERFACE
1010
STATIC MEMORY
1006
INSTRUCTIONS
1020
DRIVE UNIT
1006
INSTRUCTIONS
1020
1012
NETWORK INTERFACE
SOCIAL NETWORK
1014

FIG. 24

APPARATUS AND METHOD FOR MODEL-BASED SOCIAL ANALYTICS

BACKGROUND

Social networks are used by businesses to advertise and market products. For example, a company may use a social network to announce the launch of a new product. Consumers then write blogs, send messages, etc. discussing and reviewing the new product. The product launch may be considered a success or a failure based on the social network interactions surrounding the new product. For example, the product launch may be considered a success when a large number of consumers generate a large number of positive social network reviews about the new product. The product launch may be considered a failure when there is little "buzz" surrounding the launch and only a small number of consumers generate a relatively small number of social network reviews. The product launch could also be considered a failure when a large number of negative reviews are generated about the new product.

Companies face a challenge monitoring and managing social network interactions regarding their products. For example, a large company may have millions of followers on their social networks that send or post millions of messages related to different products. Companies may not have the human resources to manually monitor and manage such large amounts of social network traffic.

Even if companies had the human resources to monitor related social network traffic, it would still be difficult to quantitatively measure the performance of social network marketing campaigns. For example, the marketing campaign may not necessarily be directed to increasing the sales of a specific product, but may be directed to increasing general product awareness. Reviewing a small window of subjective consumer comments sent over social networks may not provide the quantitative analytics needed to clearly determine the success of the product awareness marketing campaign.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts an example of a social analytic system.

FIG. **2** depicts an example of how constituent relationships are associated with different accounts.

FIG. **3** depicts an example of how contextual dimensions and relationships are identified for different accounts and signals.

FIG. **4** depicts an example of how a conversation is associated with an account.

FIG. **5** depicts an example process for associating different parameters with a conversation.

FIG. **6** depicts an example of different contextual dimensions and relationships assigned to a signal.

FIG. **7** depicts an example of how analytics may be generated for an account based on an associated conversation.

FIG. **8** depicts in more detail an example of a model based social analytic system.

FIG. **9** depicts an example of an analytics pipeline used in the analytic system.

FIG. **10** depicts an example of collectors used in the analytics pipeline.

FIG. **11** depicts example process performed by the collectors.

FIG. **12** depicts an example of how signals are collected from social networks.

FIG. **13** depicts an example of normalized signal data.

FIG. **14** depicts examples of metadata extracted from the signals.

FIG. **15** depicts an example process for enriching signal data with additional metadata.

FIG. **16** depicts examples of enriched signal data.

FIG. **17** depicts an example process for identifying a signal associated with a contextual dimension for a brand.

FIG. **18** depicts an example of metrics generated from the signals.

FIG. **19** depicts an example process for dynamically adding accounts to the analytics system.

FIG. **20** depicts an example of a process for generating scores for analytic system accounts.

FIG. **21** depicts an example of a process for displaying analytics for different accounts.

FIG. **22** depicts an example of an electronic page displaying social analytics for the different accounts.

FIG. **23** depicts another example of an electronic page displaying social analytics for the different accounts.

FIG. **24** depicts an example of a computing device used for implementing the analytic system.

DETAILED DESCRIPTION

A model-based social analytic system collects social signals for an expansive range of different industries in accordance or consistent with applicable laws or terms. Analytics are derived from the social signals and used as benchmarks for comparing social network performance relative to particular industries, companies, brands, competitors, geographic regions, etc.

The model-based approach used by the social analytic system identifies unique relationships between different social network accounts and social signals. For example, the analytic system may identify conversations related to a particular topic or brand and may distinguish between different constituents participating in the conversations. The analytic system may then derive quantitative analytics for the different industries, companies, brands, geographic regions, etc. based on the related conversations and constituents. The social analytic system can more efficiently derive more accurate quantitative analytics by uniquely identifying and analyzing the social signals that are most relevant to the social network performance of a particular entity.

FIG. **1** depicts an example of a model based social analytic system **100**. In one example, data sources **102** may comprise one or more social networks **104**, such as Twitter®, Facebook®, YouTube®, Google+®, or the like, or any combination thereof including pre-existing services that aggregate social sources (such as BoardReader®). However, data sources **102** may comprise any computing system or social network that generates or aggregates messages that may be exchanged or reviewed by different users.

Accounts **108** are stored within analytic system **100** and identify corresponding social network accounts within the social networks **104**. In one example, accounts **108** may attempt to identify substantially all of the social network accounts for substantially every major company for a variety of different industries. Accounts **108** also may attempt to identify substantially all of the social network accounts for substantially all of the products marketed by each of the companies.

Any combination of computing devices, such as network servers and databases may operate within analytic system **100** and collect signals **106** from Application Programmer Interfaces (APIs) or other collection schemes, including collecting signals **106** from third parties. Signals **106** may contain con-

tent and/or metadata for messages sent or posted by the associated network accounts. For example, signals **106** may include the content of the message, the user account information for the social network sending the message, tags identifying the context of the message, a Universal Resource Locator (URL) for the message, a message type identifier, etc.

For explanation purposes, messages may refer to any communications exchanged via a social network **104** and any content or information that may be associated with the communication. For example, messages may comprise posts, blogs, Tweets, re-tweets, sentiment indicators, emails, text messages, videos, wall posts, comments, photos, links, or the like, or any combination thereof.

Accounts **108** and signals **106** may be associated with contextual dimensions, such as companies **110**A, brands **110**B, geographic regions **110**C, etc. Similarly, the accounts **108** and signals **106** may be associated with different types of constituents **111**, such as advocates, influencers, partners, detractors, or market participants. Values of contextual dimensions **110** may be identified a priori or may be determined from the message content or metadata in signals **106**. For example, Universal Resource Locators (URLs) or hash tags within signals **106** may identify a particular brand **110**B. In another example, the message content in signal **106** may include keywords that refer to brand **110**B.

Constituents **111** may be based on the number and types of messages sent from the associated social network accounts and the metrics associated with the associated social network accounts. For example, a first constituent that sends or posts a large number of positive messages related to a particular company may be identified as an advocate of the company. A second constituent that has a relatively large number of followers may be identified as an influencer.

Analytic system **100** may identify different relationships **112** between different signals **106**, between different accounts **108**, and/or between different signals and different accounts. For example, analytic system **100** may identify different on-line conversations **112** associated with brand **110**B. Signals **106** associated with conversations **112** about brand **110**B may be assigned associated conversation identifiers.

Analytics system **100** then may generate different social analytics **114** for brand **110**B based on the associated conversation **112** and constituents **110**D participating in conversation **112**. For example, analytic system **100** may generate a quantitative score for one of accounts **108** associated with brand **110**B based on the strength of conversations **112** associated with brand **110**B. The strength of conversations **112** may be based on the number of signals **106** and number and types of constituents **110** participating in the conversations **112** related to brand **110**B.

Contextual dimensions **110**, constituents **111**, and relationships **112** allow analytic system **100** to derive quantitative performance scores for a wider variety of different definable entities. The modeling provided by contextual dimensions **110**, constituents **111**, and relationships **112** also allow more efficient and accurate social analytics generation by identifying and processing signals **106** most relevant to accounts **108**.

FIG. **2** depicts a conceptual diagram showing in more detail constituent relationships between different accounts. It should be understood that this is just one example of how social data may be modeled by the analytic system. Accounts **108**D and **108**E may represent social network accounts operated by companies. For example, a car company may operate account **108**D. Accounts **108**D and **108**E may be identified by the analytic system as having a partner relationship. For example, account **108**E may be a wholesale or retail company that sells cars for the car company operating account **108**D.

Accounts **108**A may represent social network accounts operated by individuals. For example, one of accounts **108**A may be operated by a consumer that has purchased a vehicle from the car company associated with company account **108**D. The analytic system may identify individual accounts **108**A as having a market relationship **115**A with company account **108**D. For example, the analytic system may identify individual accounts **108**A that have sent, posted, or viewed messages related to company account **108**D. The analytic system may identify other individual accounts **108**B that have market relationships **115**B with company account **108**E.

The analytic system also may identify employee relationships **115**C between individual accounts **108**C and company account **108**. For example, individual accounts **108**C may be operated by employees of the company operating company account **108**D.

Individual account **108**F may be identified as having an influencer relationship **115**E with company account **108**E. Similarly as for market relationships **115**A and **115**B, the analytic system may determine that account **108**F generates messages, views messages, or has other types of interactions related to company account **108**E.

However, individual account **108**F may have a greater influence in the social network than individual accounts **108**A and **108**B having market relationships **115**A and **115**B, respectively. For example, individual account **108**F may be identified as having a large number of followers or subscribers in the social network and therefore may be identified as having an influencer relationship **115**E with company account **108**E. The market relationships associated with individual accounts **108**A and **108**B may have been determined to have a fewer number of followers or subscribers that personal accounts with influencer relationships.

Individual account **108**G may be identified as having both an employee relationship **115**F with company account **108**D and an advocate relationship **115**G with company account **108**E. For example, individual account **108**G may be operated by an individual employed by the company operating company account **108**D. The employee also may send or post a large number of messages about the company operating company account **108**E. The analytic system may determine that the messages generated by individual account **108**G related to company account **108**E have an overall positive sentiment. Accordingly, the analytic system may identify an advocate relationship **115**G between individual account **108**G and company account **108**D.

Advocate relationships **115**G may be different from influencer relationships **155**E. Influencer relationships **115**E may have some a large number of interactions with different accounts but may not necessarily have a large number of interactions specifically with company account **108**E. For example, individual account **108**F may send or post a large number of messages about a large number of topics, but not necessarily send or post a large number of messages to or about company account **108**E. However, as mentioned above, individual account **108**F may have a relatively large number of followers. On the other hand, individual account **108**G having advocate relationship **115**G may send or post a relatively large number of positive messages to or about company account **108**E. However, individual account **108**G may have a relatively small number of followers or subscribers.

Distinguishing between influencer relationships and advocate relationships may provide valuable analytics for the company operating company account **108**E. For example, the company may want to increase or direct more social network

interactions or attention to individual account **108**F (influencer account) in order to persuade the individual operating individual account **108**F to start sending or posting more positive messages about the company.

These directed interactions with individual account **108**F may result in a larger positive impact on the social network rating for company account **108**E than increasing interactions with individual accounts **108**A or **108**B (market accounts) or individual account **108**G (advocate account). Individual account **108**F has been determined to have a relatively large number of subscribers. Therefore, causing individual account **108**F to generate more positive messages about company account **108**E may have a relatively large positive impact within the social network.

The analytic system has already determined that advocate account **108**G generates a relatively large number of positive messages related to company account **108**E and has also determined that individual account **108**G has fewer followers than individual account **108**F. Thus, increasing interactions with individual account **108**G may not substantially increase the number of positive messages generated by individual account **108**G, increase the number of other social network participants viewing positive messages regarding company account **108**E, or increase in the overall social network performance of company account **108**E.

FIG. **3** depicts one example of a process for identifying and assigning contextual dimensions to accounts and/or signals and identifying other relationships between the contextual dimensions and other accounts and signals. In operation **150**, the analytic system may identify metadata in the signals identifying different contextual dimensions. For example, the signal may include a URL that identifies a particular company, brand, and/or geographic region. For example, the URL may have the following format:

http://www.social_network.com/company/brand.

The signals may contain other tags that identify the contextual dimension. For example, the signal may include a mention field, hash tag, etc. that identifies the company or brand related to the associated message content. In operation **152**, the analytic system may assign a unique contextual dimension identifier to the signal identifying the company or brand.

Alternatively, the analytic system in operation **150** may identify keywords in the content of the signals that identify the associated contextual dimension. For example, a user of an account may post or send a message that discusses a particular company, brand, etc. The analytic system may compare keywords in the message with keyword topic clusters associated with the company and/or brand. In operation **152**, signals may be assigned contextual dimension identifiers associated with the matching keyword topic clusters.

In operation **154**, the analytic system may identify other relationships between the accounts, signals, and/or contextual dimensions. For example, the analytic system in operation **154** may identify the types of constituents associated with the signals. For example, a company X may send or post a message about one of their brands Y. In operation **152**, the analytic system may assign a first identifier to the signal identifying the contextual dimension for the signal as brand Y and in operation **156** may assign a second identifier to the signal identifying company X as the sender or poster of the message.

In another example, an employee of company X may send or post a message about brand Y. The analytic system in operation **152** may assign a first identifier to the signal identifying a contextual dimension for the signal as relating to brand Y and in operation **156** assign a second identifier to the signal identifying the sender or poster of the message as an employee of company X. The employee relationship between the signal and brand Y may be determined a priori from information provided by the company or may be determined by the analytic system from the URL for the signal that may indicate the signal was sent from an employee account for company X.

In yet another example, a message may be sent or posted from an account that is not directly associated with company X. For example, a consumer may send or post a message related to brand Y. In operation **154**, the analytic system may identify the relationship between the consumer account and the company X based on the number and/or types of signals generated from the consumer account. As explained above, the analytic system may identify the consumer account as an advocate of the company X account when the consumer account generates a large number of positive sentiment messages related to company X.

FIG. **4** depicts in more detail one example of how signals are associated with a same conversation. Users of social networks may conduct conversations regarding different topics. For example, a user may send or post messages regarding the release of a new film. Other users then may respond to the original message and other users may respond to the responses. The responses may repeat the original message, add links to additional information related to the conversation, and/or provide sentiments regarding the conversation topic.

The analytic system relates the communications together as a conversation, identifies the account and contextual dimension related to the conversation, and then generates analytics for the account based on the conversation.

In operation **170**, metadata may be identified that associates social signals with a particular conversation. For example, a social network such as Twitter® may embed tags into signals identifying the message as a re-tweet of a prior Tweet message. In operation **172**, the analytic system may assign a same conversation identifier to the original Tweet message and the re-tweet message.

The analytic system may analyze the content of the message to discover signals related to the same conversation. For example, the words used in different messages may be compared in operation **174** and topic clusters may be generated from the matching keywords in operation **176**. In operation **178**, content in the social signals may be compared with the keywords for the topic clusters. Social signals matching the same topic cluster may be associated with a same conversation. In operation **180**, the social signals associated with the same conversation may be assigned a same conversation identifier.

In operation **182**, the conversations may be associated with different contextual dimensions. For example, conversations may be associated with different companies, brands, geographic regions, etc. The signals may be assigned additional identifiers identifying the contextual dimension related to the associated conversation.

FIG. **5** depicts an example process for associating other metrics with conversations. In operation **188**, a contextual dimension may be associated with the conversation. For example, as mentioned above, the conversation may be associated with a company, brand, service, industry, etc.

In operation **190**, a start time and a time of a latest addition to the conversation may be identified. In operation **192**, other time factors may be identified for the conversation. For example, the number of participants and sentiment of the conversation may be tracked over time.

In operation **194**, an account within an ecosystem containing the conversation may be identified. For example, the conversation may be associated with a particular product and the to product may be associated with an account for a particular company. The ecosystem for the company may comprise the explicit followers of the company and all the communications generated within the context of the company accounts that are publicly visible.

In operation **196**, a root signal initiating the conversation may be identified. For example, the conversation may spawn from a product announcement sent or posted by a company. Operation **198** may identify the social network service associated with the conversation. For example, the conversation may be conducted on a single social network, such as Twitter® or may extend over different social networks such as Twitter®, Facebook®, and YouTube®.

Operation **200** may identify a strength of the conversation. For example, the analytic system may derive an arithmetic average of the percentiles of average discussion length, company/constituent discussion strengths, total discussions, total signal count, constituent signal counts, and company signal count.

Operation **204** may identify the type of communications used in the conversation, such as posts, blogs, videos, comments, etc. and operation **206** may identify a geographic region associated with the conversation. For example, some of the signals associated with the conversation may include videos and most of the signals associated with the conversation may come from accounts located in the United States.

FIG. **6** depicts an example of the contents of a signal **210** containing contextual dimension and conversation identifiers. An account identifier **212**A may identify the account in the analytic system associated with signal **210**. A signal identifier **212**B provides a unique identifier for signal **210** collected from the social network.

A root signal identifier **212**C may identify a signal that started a particular conversation. For example, the root signal may be the message sent or posted by a company announcing a new product release. Conversation identifier **212**D may identify the conversation associated with signal **210**. For example, signal **210** may be a message commenting resending, viewing, re-tweeting, mentioning, etc. the new product release message associated with root signal identifier **212**C.

Ecosystem identifier **212**E may identify the ecosystem related to signal **210**. As explained above, the analytic system may identify an ecosystem as an account for a company and all of the explicit followers of the company and all the communications generated within the context of the company accounts that are publicly visible. Any account or signals associated with the ecosystem may be assigned a same ecosystem identifier **212**E and the number of followers in the ecosystem may be identified.

A type identifier **212**F may identify a type of message associated with signal **210**. For example, the message contained in signal **210** may be a post, tweet, re-tweet, echo, blog, etc. A topic identifier **212**G may comprise a set of keywords identifying a particular topic of the message contained in signal **210**. Any topic can be identified but in one example the topic may be related to a company or brand.

An industry identifier **212**H may identify a particular industry associated with signal **210**. A brand identifier **212**I may similarly identify a brand associated with signal **210**. Again the industry or brand may be identified from metadata contained in the signal **210** or may be determined from the content of the message contained in signal **210** using machine learning algorithms.

A sentiment **212**J may identify a sentiment of the message contained in signal **210**. For example, the user generating the message may have assigned a like or dislike sentiment identifier to the message or the content **212**M of their communication may be identified by the system to be variously positive, neutral, negative, or otherwise. A time indicator **212**K may identify when signal **210** was generated or collected from the social network. Strength value **212**L may identify the strength of the conversation based on the number of other signals and the types of constituents participating in the conversation. Content **212**M comprises the content of the message contained in signal **210**. For example, content **212**M may comprise a text message, links, photos, videos, or the like, or any combination thereof.

FIG. **7** depicts one example process for generating analytics for an account based on associated conversations. Again, FIG. **7** shows just one example of any combination of parameters that may be used for generating any type of analytics. In operation **230**, the analytic system may identify conversations for an account associated with a particular contextual dimension. For example, the conversation may be related to a particular product.

In operation **232**, the analytic system may identify the different types of constituents participating in the conversation. In operation **234**, a sentiment and/or influence of the constituents may be identified. As described above, some social networks may allow constituents to attach sentiment ratings to messages. In another example, the analytic system may derive the sentiment ratings from the messages using machine learning algorithms. The sentiments of messages generated by a particular constituent during the conversation may be averaged to determine an overall sentiment for the constituent.

The analytic system may also derive influence values for the constituents. As also mentioned above, the analytic system may identify the number of messages sent or posted by the constituents, the number of followers of the constituents, the number of messages of the constituents resent in other messages, etc. Any combination of these influence factors may be combined to derive influence values for the constituents participating in the conversation.

Operation **236** may determine the size and strength of the conversations. For example, the analytic system may determine an overall size and strength of the conversations based on the number of constituents participating in the conversation, the influence of the constituents participating in the conversation, the number of messages sent during the conversation, etc.

In operation **238**, the analytic system may generate analytics for an account based on any of the above conversation metrics. For example, the analytic system may generate a quantitative score for a brand associated with the conversation based on any combination of the types and number of constituents, influence and sentiment of the constituents, and overall size and strength of the conversation about the brand.

FIG. **8** depicts a more detailed example of the analytic system **100**. Analytic system **100** may comprise an array of local and/or cloud-based computing and storage devices, such as servers and database systems for accessing and processing data collected from different social networks **104**. A computing device **308**, such as a personal computer, computer terminal, mobile device, smart phone, electronic notebook, or the like, or any combination thereof may be used for viewing the analytic data **306** generated by analytic system **100**. For example, computing device **308** may access and display analytic data **306** via a web browser or mobile device

application. In other embodiments, some or all of analytic data **306** may be generated by computing device **308**.

All of the different computing devices within analytic system **100** may be coupled together via one or more buses or networks. Similarly, analytic system **100** may be coupled to social networks **104** and computing device **308** via one or more buses or networks. The busses or networks may comprise local area networks (LANs), wide area networks (WANs), fiber channel networks, Internet networks, or the like, or any combination thereof.

In one example, analytic system **100** may continuously track social performance for thousands of companies and create one or more accounts **108** for each of the companies. As mentioned above, accounts **108** may be associated with accounts on different social networks **104**, such as Twitter® accounts, Facebook® accounts, YouTube® accounts, or any other data source where social signals **106** may be generated. The accounts on social networks **104** may be operated by companies, individuals, or any other entity.

The analytics system **100** may assign contextual dimension identifiers to accounts **108** identifying the companies, brands, services, individuals, or any other entity operating the associated accounts in social networks **104**. One of accounts **108** associated with a company may be referred to as a company account. The company account **108** may have an associated social graph consisting of other related accounts **108**. The set of all accounts **108** related to the company account may be referred to as an ecosystem of the company account. The ecosystem for the company account may comprise both a static social graph and a dynamic social graph.

The static social graph may comprise the set of all accounts **108** that either follow or are followed by the company account and may comprise a statically defined relationship between the accounts. For example, an account **108** associated with a brand or subsidiary of the company account may be identified as having a static relationship with the company account.

The dynamic social graph may be a set of accounts **108** that have interacted with the company account in some way whether or not there is a static relationship. For example, an account **108** may mention in a message the company associated with the company account or may forward a message from the company account.

The ecosystem for the company account also may be delineated based on constituent type. As mentioned above, examples of constituents may include the company itself, employees, partners, advocates, detractors, market, and influencers. For example, employees may be employees of the company, and partners may be distributors, retailers, or subsidiaries having a business relationship with the company. Advocates may be associated with accounts that frequently generate positive messages about the company and detractors may be associated with accounts that frequently generate negative messages about the company.

Influencers may have a relatively large influence on the social network. For example, influencer accounts may have a large number of social network followers. Market may comprise any other accounts that may send, post, or view messages related to the company.

Analytic system **100** may comprise an analytic pipeline **300**, a measures module **302**, and a social business index module **304**. Analytics pipeline **300** may comprise software configured to collect signals **106** from the different social networks **104** associated with accounts **108**. Measures module **302** may comprise software configured to generate metrics from the social signal data collected by analytic pipeline **300**. Social business index (SBI) **304** may comprise software configured to use the data collected and generated by analytics pipeline **300** and the measures module **302** to display social analytic data **306** identifying social business performance, adoption, and any other social activity. For example, social analytic data **306** may display quantitative scores for different companies, social relationships between brands and their engaged audiences of various constituents, and provide real-time benchmarking for industries, companies, brands, competitors, or geographic regions.

FIG. **9** depicts one example of analytics pipeline **300** in more detail. Multiple collectors **320** are configured to interact with various social networks **104** to collect signals **106**. Collectors **320** may collect signals **106** in a native or raw form provided by social networks **104** and store the signals as raw data **328**. Signals **106** may comprise the messages generated from the social network accounts and the metadata associated with the messages. For example, the messages may comprise text, audio, video, links sent or posted from a social network account. The messages may be in any format, such as a blog, post, Tweet, etc.

The metadata associated with the messages may identify any static or dynamic relationship between the social network account and other social network accounts on the same network. For example, static relationship data may identify social network accounts for employees, brands, etc. located under a domain for a company network account. As described above, these static account relationships may alternatively be referred to as the static social graph for the company account.

The metadata may also identify dynamic relationships between social network accounts. For example, the metadata in one of signals **106** may indicate the signal mentioned or resent another message from another social network account. As also described above, the dynamic relationship between signals and accounts may be alternatively referred to as the dynamic social graph for the account.

Normalize module **322** may convert raw data **328** into normalized data **330**. For example, normalize module **322** may convert the different formats of the messages generated by the different social networks **104** into a generic format and load the content and metadata for the messages into columns of a table. The original format used in the messages may be identified in the table.

Enrichment module **324** may identify or generate additional metadata that identifies contextual dimensions, constituents, and relationships for signals **106**. For example, enrichment module **324** may identify signals **106** related to specific brands and may identify signals **106** that form conversations about those brands. Analysis module **326** may generate additional metrics **332** for the normalized/enriched data **330**. For example, analysis module **326** may generate a score for an account based on the number and types of conversations and constituents associated with the account.

A workflow coordinator **318** may coordinate the operations performed by the different modules in analytic pipeline **300**. For example, workflow coordinator **318** may determine how often collectors **320** collect signals **106** from social networks **104** and when normalize module **322**, enrichment module **324**, and analysis module **326** process the signals.

FIG. **10** shows a more detailed example of collectors **320**. Collectors **320** may use application programmers interfaces (APIs) to collect the social signals **106** from the social network accounts within social networks **104**. Two different types of collectors **320** may be used. Polling collectors **320**A may be used as a client-initiated pulling mechanism to make API calls to associated social networks **104**A. In one example, the polling collector **320**A may be scheduled by workflow coordinator **318** to run at regular periodic intervals, such as every 15 minutes, 30 minutes, hour, etc.

Streaming collectors **320**B may use a server-initiated push mechanism where APIs in social networks **104**B continuously push new signals to streaming collectors **320**B in real-time. Collectors **320** may operate independently from other processing modules in the analytics pipeline to improve performance.

Collectors **320** may continuously collect social signals **106** for entire industries. For example, collectors **106** may collect social signals **106** from substantially every known social network account operated by car companies. An initial set of seed accounts **108** may be provided to collectors **320** and may identify substantially all of the social network accounts for the different car companies. For example, one of the seed accounts **108** may identify a first account on Facebook® for a car company and a second seed account **108** may identify a second account on Twitter® for the same car company. Seed accounts **108** also may identify social network accounts for different car brands marketed by the car companies. For example:

Seed Account #1=http://Twitter@car company

Seed Account #2=http://Twitter@car company_car brand

New accounts **108** may be added to the collection process via social business index (SBI) **304**. For example, a user may use a SBI interface to identify a new company account or individual account in a social network for collecting social signals. The new account may be validated by one of collectors **320** and then synchronized into a master list with existing accounts **108**.

Analysis module **326** may dynamically identify and add new accounts **108**. For example, analysis module **326** may identify messages generated about a product. Some of the signals containing the messages may have come from a social network account that does not currently exist in accounts **108**. For example, one of the social network accounts may belong to a company that does not currently have an associated analytic system account **108**. In another example, the social network account may be owned by an individual that sends or posts large numbers of messages about products sold by the company.

Analysis module **326** may identify the social network account as a source, influencer or advocate for the company and automatically add a new account **108** to the analytic system that identifies the social network account. Collectors **320** then may start periodically collecting signals from the newly identified social network account.

FIG. **11** depicts an example process for the collectors. In operation **360**, the collectors identify accounts in an account database of the analytic system for collecting social signals. Some accounts may be provided a priori and used as seed accounts. For example, a company may provide all of the social network accounts associated with their company, all social network accounts for with any products sold by that company, and/or all social network accounts for employees that work for the company.

In operation **361**, new accounts may be dynamically added to the existing accounts either manually by users via the social business index interface or automatically by the analytic module. In operation **362**, the collectors are triggered to poll signals from the social networks identified by the accounts. For example, some social signals may be collected from the social networks every 15 minutes. Other signals may be continuously streamed from the social networks to the collectors.

In operation **364**, some signals may be missing. For example, the servers operating the polling or streaming APIs may temporarily go down or be overloaded and lose connectivity with the collectors. In operation **366**, the collectors may automatically poll the social networks for the missing signals.

In operation **368**, the collectors may extract all necessary content, account, and meta-data contained in the signals. For example, the collectors may extract the content of the messages that are posted or sent from the account, extract meta-data that identifies the types of messages, and extract account information that identifies the static relationship of the account to other accounts. Operation **370** may store the social signals in time buckets. For example, all of the social signals collected during a particular time period may be assigned to the same time bucket. The time buckets allow the analytic system to generate analytics for any definable time period, such as for a particular hour, day, month, year, etc.

FIG. **12** depicts another example of how collectors **320** may extract data from the signals generated by different social networks. Accounts **108** may identify a first social network (SN_**104**A) containing an account for a business A (SN_**104**A@BIZ_A). Accounts **108** may identify a second social network (SN_**104**B) containing an account for a constituent A (SN_**104**B@CONSTITUENT_A) and an account for a constituent B (SN_**104**B@CONSTITUENT_B).

Collectors **320** collect the signals from the social networks **104**A and **104**B associated with accounts **108**. In one example, collectors **320** may collect a signal #**1** that contains a message generated from the social network account of business A announcing the launch of a new phone. Collectors **320** may collect a second signal #**2** from the social network account of constituent A providing a favorable review of the new phone. Collectors **320** also may collect a third signal #**3** from the social network account of constituent B providing a negative review of the new phone. Collectors **320** may store the contents of signals #**1**, #**2**, and #**3** as raw signal data **328**.

Collectors **320** may also extract metadata associated with the signals. For example, a Tweet message may contain a mention tag identifying the new phone. The collectors extract and store the mention tag with the Tweet message. The analytic system may use the mention tag to associate the signal with a contextual dimension. For example, the mention tag may identify the brand name of the new phone and an associated brand identifier may be assigned to the signal. Similarly, collectors **320** may extract and store hash tags from the messages identifying different contextual dimensions for the signals.

FIG. **13** depicts a conceptual example of normalized signal data generated by the normalize module **322** for the analytic pipeline shown in FIG. **9**. This of course is just a small example of different content, metadata, and other parameters that may be extracted from the social signals. Different content and metadata may be extracted from the raw signal data and loaded into associated columns of table **380**.

Each column of table **380** may represent a different parameter associated with a signal and each row of table **380** may contain the parameter values for a different signal. For example, column **382**A may identify the social network account that posted or sent the message and column **382**B may identify the social network account where the message was sent. Field **382**B may be null when a message is posted and not sent to a specific network account. Column **382**C may identify the social network producing the signal. Column **382**D may identify the date and time the signals are generated or collected and column **382**E may assign unique identifiers to each signal.

Column **382**F may identify the type of message associated with the signal. For example, signal #**1** may contain a message posted on a Facebook® account, signal #**2** may contain a Tweet message sent from the Twitter® account for constituent A, and signal #**3** may contain a re-tweet message sent from the Twitter® account for constituent B. Column **382**G may

contain the content of the message. For example, column **382**G may contain the text messages posted or sent from the different social network accounts.

The normalize module converts the signals from the different social networks into a generic format for easier analytic system processing. However, the normalization process still maintains the signal metadata that may identify static or dynamic relationships with other signals or accounts. For example, the retweet identifier in column **382**F may indicate signal #**3** contains a previously sent message from signal #**2** and therefore may identify signal #**2** and signal #**3** as being part of the same conversation related to the new phone.

FIG. **14** shows other examples of information that may be extracted from the social signals and loaded into table **380**. Again these are just examples of any number of parameters that may be extracted from the social signals.

SIGNAL_ID: A unique identifier for the signal.

TIME: The time the signal was generated.

TIME BUCKET: A monitored time period associated with the signal.

SIGNAL TYPE: POST, REPLY, ECHO.

CONTENT TYPE: Tweet, wall post, blog, forum, video, comment, photo, etc.

SERVICE ACCOUNT ID: Identifier of the account that originated the signal.

ECOSYSTEM ACCOUNT ID: Identifier of the account for an ecosystem containing this signal.

SERVICE: The social network used for generating the signal, such as Twitter®, Facebook®, YouTube®, etc.

URL: The URL for the social network account that generated the signal.

PARENT SIGNAL ID: The identifier of the original signal for a reply or echoed signal.

TAGS: Hash tags tagged to the signal.

LINKS: URL links embedded in the signal.

CONTENT: Content of signal.

FIG. **15** depicts an example of a process for enriching normalized signal data. In operation **400**, account identifiers are assigned to the collected signals. For example, signals received from a particular social network account may be assigned an account identifier associated with the social network account. In operation **402**, contextual dimensions may be assigned to the signals. As discussed above, the analytic system may identify an industry, company, brand, etc. with the account or the signal. For example, the signal may be collected from a social network account associated with a particular car brand sold by a car company. The signal may be assigned an industry identifier associated with the automobile industry, assigned a company identifier associated with the car company, and/or assigned a brand identifier associated with the car brand.

Operation **406** may associate geographic regions with accounts or signals. For example, a social network may include social network accounts for different geographic regions, such as North America, Europe, Asia, etc. The analytic system may assign location identifiers to the accounts and signals identifying the associated geographic regions. The geographic region identifiers provide yet another contextual dimension for generating social analytics.

Operation **408** may identify constituent types associated with the accounts. As discussed above, one account may be associated with a car company and a second account may be associated with an individual who frequently comments on the products produced by the car company. An identifier may be assigned to the individual account identifying the individual account as a particular type of constituent of the car company, such as an advocate, detractor, influencer, market, partner, etc.

Operation **410** may identify a size and/or strength of the networks associated with the contextual dimensions, accounts, signals, etc. For example, the company account may have a number of members, subscribers, employees, followers, etc. The total number of these associations may be counted and identified as the network size for the company account. The number of signals that are sent, posted, received, and/or viewed by on the company account also may be tracked. The network strength for the company account may be derived from the number of signals associated with the account for a give time period, size of the company account, types of constituents associated with the company account, and/or any other parameters that may indicate a robustness of the social interactions for a particular account.

Operation **412** may identify conversations associated with different signals and/or accounts. As explained above, different signals may be associated with a same contextual dimension or topic of conversation and assigned an associated conversation identifier.

FIG. **16** depicts one example of a table **420** containing some of the metadata described in FIG. **15** that is added to the signals.

INDUSTRY_ID: Identifier of industry associated with signal. The identifier may be obtained from the signal content, a domain database, or from a conversation associated with the signal.

BRAND_ID: Identifier of brand associated with the signal. The identifier may be obtained from the signal source, domain database, or associated conversation.

ECOSYSTEM_ACCOUNT_ID: Identifier of an account that owns an ecosystem associated with a signal. The ecosystem can be any accounts, signals, or contextual dimension associated with the account.

REGION_ID: Identifier of the geographic region associated with the signal. The identifier may be gathered from the signal source, company account, or conversation.

NETWORK_SIZE: Size of network reached by the signal.

NETWORK STRENGTH: Strength of network associated with the signal. For example, a signal broadcast to a network with a large number of subscribers may a larger strength value than a network with fewer subscribers.

CONVERSATION_ID: Identifier of a conversation the signal belongs to.

FIG. **17** shows one example of how signals may be associated with a particular brand. This is just one example of how signals can be associated with any contextual dimension. In operation **428**, the analytic system may identify a brand associated with a particular account. As discussed above, the brand may be identified and associated with a particular social account based on a priori data provided by a company or the brand may be dynamically derived, discovered, and/or associated with the account by the analytic system. An identifier associated with the brand may be assigned to the account.

In operation **430**, the brand may be mentioned in messages contained in the signals. In operation **432**, signals may mention competitive brands. For example, a message may compare the brand to other similar competitive brands in a same industry. In operation **434**, words in the signal messages may be aligned with company content targeted toward the brand. For example, a topic cluster of keywords may be derived from the social signals generated by the company account that markets the brand. A topic vector for the topic cluster may be compared with the words in other signals.

In operation **436**, signals may have previously been associated with the brand or associated with conversations discussing the brand. Other signals that take part in the conversations may be identified as related to the brand. In operation **438**, the analytic system may assign the brand identifier to signals having any combination of the brand relationships described above.

FIG. **18** depicts an example of metrics that may be generated by analysis module **326** in FIG. **9**. The following are only examples of any variety of metrics that may be generated by the analytic system and added to a metrics table for an account and/or signal.

- RATING: Identities an overall rating for a signal or an account. The rating may be based on a score generated from any combination of metrics.
- SIGNAL COUNT: Identifies a number of signals relating to the account for a particular time period. For example, the signal count may identify the number of messages generated for a particular brand within the time period.
- RATING_COUNT: Number of ratings received by the account. Some social networks allow users to rate signals, accounts, etc. For example, the users may rate an article or product with a like, dislike, star rating, etc.
- LIKES: Number of times the signal was assigned a like or other positive rating.
- DISLIKES: Number of times the signal was assigned a dislike or other negative rating.
- FAVORITES: The number of times the signal was given a favorite rating.
- IMPRESSIONS: The number of times the signal has been viewed.
- LISTINGS: The number of times the signal has been added to a signal list.
- MENTIONS: The number of times another signal has mentioned by another account or signal.
- SENTIMENT: A sentiment score based on sentiment classifiers, such as a negative, neutral, or positive rating assigned to the signal.

FIG. **19** depicts one example of how new accounts may be dynamically identified and added to the analytic system. In operation **441**, the analysis module may identify signals from a social network account that are related to a particular contextual dimension. For example, the social network account may comprise a Twitter® account that is not currently identified in the analytic system. The analysis module may identify different signals associated with the same conversation. Some of the signals in the conversation may come from the Twitter® account. For example, some signals in the conversation may be replies to signals coming from the Twitter® account.

Operation **442** may determine if the number of signals generated by the Twitter® account is above a first threshold. For example, the analysis module may identify the number of signals generated by the Twitter® account during the conversation or the number of signals that relate to a particular contextual dimension. The Twitter® account might not be added to the analytic system if the number of signals is below the first threshold.

Operation **444** may determine if a strength of the Twitter® account is above a second threshold. For example, the strength may be based on the number of followers for the Twitter® account. The Twitter® account might not be added to the analytic system if the strength of Twitter® account is below the second threshold.

Operation **446** may determine an overall sentiment for the signals from the Facebook® account related to a particular contextual dimension. For example, the analysis module may determine the overall sentiment for messages sent or posted from the Facebook® account that relate to company X. Operation **448** may identify the Facebook® account as an advocate of company X when the messages from the Facebook® account have any overall positive sentiment. Operation **447** may identify the Facebook® account as a detractor of company X when the messages from the Facebook® account have any overall negative sentiment. Operation **448** may identify the Facebook® account as an influencer of company X when the messages from the Facebook® account have a mixed sentiment and the strength of the Facebook® account is above a particular level identified in operation **444**.

In operation **450**, the analytic system may determine if the Twitter® account currently exists in the analytic system. For example, the analytic system may determine if any of the accounts stored in the analytic pipeline contain the URL for the Twitter® account. If not, the Twitter® account may be added to the analytic system in operation **452**. The Twitter® API operated by the collector may be automatically configured to start periodically polling or streaming signals from the Twitter® account.

Thus, the analytic system identifies and adds new accounts that generate the most relevant signals for the contextual dimensions and associated accounts.

FIG. **20** depicts one example of how scores may be generated for accounts. Again, this is just one example of any number of different scores that may be generated by the analytic system for any account or defined contextual dimension. Operation **461** may identify conversations associated with an account. As previously described, the account may be associated with a brand and the conversations may discuss the brand. Operation **462** may identify constituents associated with the account. As also previously described, accounts participating in the conversations may be identified as advocates, detractors, partners, employees, influencers, or market.

In operation **464**, counts may be accumulated for the conversations and the constituents. For example, the counts may include the number of signals in the conversations, the number of conversations for the account, and the number of signals in the conversations associated with each of the different constituents.

In operation **466**, the strength of the conversations associated with the account may be determined. For example, the strength of conversations may be based on the number of constituents associated with the conversations, the number of signals generated by each of the constituents, the strength of the constituents, the length of the conversations, the sentiment of the conversations, etc. Some counts may be weighted differently based on other relationship with the account. For example, the count for an influencer constituent may be given a greater weight than the count for a market constituent since the influencer constituent has a relatively larger number of followers.

In operation **468**, a score may be derived for the account based on the strength of the conversations associated with the account. In operation **470**, the overall score for the account may be normalized with the scores for other accounts. For example, scores may vary based on the size of the accounts. Normalization allows different accounts to be ranked independently of account size.

In operation **472**, scores may be distributed, benchmarked, and/or applied to any selectable contextual dimension. For example, the score for an account associated with a particular product may be compared with an overall score for all products in the same industry. The product score also may be compared with scores for competing products or compared other products in similar geographic regions.

In another example, the account may be associated with a car brand and the analytic system may identify durations of different conversations associated with the car brand. The conversation durations for all other car brands may be averaged together to generate an overall average conversation duration for the car industry. The average length of social network conversations in the car industry can then be used as a benchmark and compared to the average conversation duration for the particular car brand associated with the account. The same rollup averaging and comparisons can be performed for competitor brands, geographic regions, or any other definable contextual dimension. Thus, the relationship identifiers and scores derived by the analytic system allow metrics to be distributed and compared over a large number of selectable axes.

FIG. **21** depicts an example process performed by the social business index **304** in FIG. **8**. In operation **480**, key metrics may be identified for index members. The key metrics are the metrics needed to generate scores for particular contextual dimensions. For example, scores for accounts related to products in a particular industry may use the number of mentions of the accounts, number followers of the accounts, etc. In operation **482**, scores may be generated from the metrics for the different index members. For example, scores may be generated for each brand of each company of each industry with accounts in the analytic system.

Operation **484** may rank all index members based on their associated scores. In operation **486**, the scores and the rankings may be displayed on a user interface based on industry or any other user definable contextual dimension. In operation **488**, the scores may be filtered based on industry, brand, or any other contextual dimension. For example, scores may be ranked and displayed for computer companies or for smart phones.

FIG. **22** depicts one example of an electronic page **500** generated by the social business index. A row **500**A within electronic page **500** may identify a particular company selected by a user. A row **500**B may contain a field for selecting a contextual dimension for providing comparisons. For example, the user may direct the social business index to display metrics for different clothing brands. The comparisons can be displayed for different selectable time periods, such as for a last week or a last month.

Row **500**C may display names of the different brands that the social business index is comparing. In one example, a first column identifies metrics for a line of golf clothing sold by company A. A second column may identify a purple label brand sold by company A. A third column may identify a brand #1 sold by a different company B and a fourth column may identify a brand #2 sold by company B. A fifth column may identify a particular clothing product, such as rugby shirts.

Row **500**D may identify account strength for the different brands based on any of the previously described metrics. For example, the golf line for company A may have an account strength of 7.9 and brand #2 for company B may have an account strength of 2.7. The account strength provides a quantitative score for the quantity and quality of social signals related to the brands.

Row **500**E may identify a count of the number positive signals for the brands. For example, row **500**E may identify the number of signals that liked or provided positive ratings for the brand. Row **500**F may identify the number of followers for the brand accounts.

Row **500**G may identify the overall conversation strengths for the brands as described above. For example, the account for the purple label brand sold by company A may have a conversation strength of 6.21 and the account for brand #2 sold by company B may have a conversation strength of 2.9. As described above, conversation strength may take into account an average discussion length, customer/influencer discussion strength, total discussions, total signal count, influencer signal count, etc.

A graph **500**H may display a timeline for the account strength of company A. In one example, the account strength may include a count for the number of followers company A has across all of the social networks and all associated social accounts. This may include the number of followers for all accounts associated with company A including the accounts for any subsidiaries of company A. Graph **500**H may display the account strength along a multiple week, month, or year time line.

Section **5001** may provide different selectable fields **502** for displaying other metrics. For example, one field **502**A may display metrics for competitor accounts, a field **502**B may display an industry composite metric, and a field **502**C may display an index composite for all other accounts.

FIG. **23** depicts another example of an electronic page **520** generated by the social business index. A graph **522** may display a timeline of composite business index scores for multiple different industries.

A field **524** allows a user to display the ranking for any particular business. Section **525** allows users to filter rankings based on business size and industry. Sections **526**A-**526**E show the five highest ranked companies, identifies the industries associated with the companies, and shows the previous week rankings for the companies.

FIG. **24** shows a computing device **1000** that may be used for operating the analytic system and performing any combination of the social analytics discussed above. The computing device **1000** may operate in the capacity of a server or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. In other examples, computing device **1000** may be a personal computer (PC), a tablet, a Personal Digital Assistant (PDA), a cellular telephone, a smart phone, a web appliance, or any other machine or device capable of executing instructions **1006** (sequential or otherwise) that specify actions to be taken by that machine.

While only a single computing device **1000** is shown, the computing device **1000** may include any collection of devices or circuitry that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the operations discussed above. Computing device **1000** may be part of an integrated control system or system manager, or may be provided as a portable electronic device configured to interface with a networked system either locally or remotely via wireless transmission.

Processors **1004** may comprise a central processing unit (CPU), a graphics processing unit (GPU), programmable logic devices, dedicated processor systems, micro controllers, or microprocessors that may perform some or all of the operations described above. Processors **1004** may also include, but may not be limited to, an analog processor, a digital processor, a microprocessor, multi-core processor, processor array, network processor, etc.

Some of the operations described above may be implemented in software and other operations may be implemented in hardware. One or more of the operations, processes, or methods described herein may be performed by an apparatus, device, or system similar to those as described herein and with reference to the illustrated figures.

Processors **1004** may execute instructions or "code" **1006** stored in any one of memories **1008**, **1010**, or **1020**. The

memories may store data as well. Instructions **1006** and data can also be transmitted or received over a network **1014** via a network interface device **1012** utilizing any one of a number of well-known transfer protocols.

Memories **1008**, **1010**, and **1020** may be integrated together with processing device **1000**, for example RAM or FLASH memory disposed within an integrated circuit microprocessor or the like. In other examples, the memory may comprise an independent device, such as an external disk drive, storage array, or any other storage devices used in database systems. The memory and processing devices may be operatively coupled together, or in communication with each other, for example by an I/O port, network connection, etc. such that the processing device may read a file stored on the memory.

Some memory may be "read only" by design (ROM) by virtue of permission settings, or not. Other examples of memory may include, but may be not limited to, WORM, EPROM, EEPROM, FLASH, etc. which may be implemented in solid state semiconductor devices. Other memories may comprise moving parts, such a conventional rotating disk drive. All such memories may be "machine-readable" in that they may be readable by a processing device.

"Computer-readable storage medium" (or alternatively, "machine-readable storage medium") may include all of the foregoing types of memory, as well as new technologies that may arise in the future, as long as they may be capable of storing digital information in the nature of a computer program or other data, at least temporarily, in such a manner that the stored information may be "read" by an appropriate processing device. The term "computer-readable" may not be limited to the historical usage of "computer" to imply a complete mainframe, mini-computer, desktop, wireless device, or even a laptop computer. Rather, "computer-readable" may comprise storage medium that may be readable by a processor, processing device, or any computing system. Such media may be any available media that may be locally and/or remotely accessible by a computer or processor, and may include volatile and non-volatile media, and removable and non-removable media.

Computing device **1000** can further include a video display **1016**, such as a liquid crystal display (LCD) or a cathode ray tube (CRT)) and a user interface **1018**, such as a keyboard, mouse, touch screen, etc. All of the components of computing device **1000** may be connected together via a bus **1002** and/or network.

For the sake of convenience, operations may be described as various interconnected or coupled functional blocks or diagrams. However, there may be cases where these to functional blocks or diagrams may be equivalently aggregated into a single logic device, program or operation with unclear boundaries.

Having described and illustrated the principles of a preferred embodiment, it should be apparent that the embodiments may be modified in arrangement and detail without departing from such principles. Claim is made to all modifications and variation coming within the spirit and scope of the following claims.

The invention claimed is:

1. A method, comprising:

identifying accounts associated with social networks;

collecting signals for the accounts;

associating contextual dimensions with the accounts;

identifying relationships between the accounts and/or signals and the contextual dimensions;

generating analytics for the contextual dimensions based on the relationships;

identifying the signals containing messages for a conversation discussing a same topic;

identifying a first type of user participating in the conversation as influencers that have a plurality of followers;

identifying a second type of user participating in the conversation as advocates;

determining a first weighted score based at least in part on applying a first weight to a first portion of the messages generated by the influencers;

determining a second weighted score based at least in part on applying a second weight to a second portion of the messages generated by the advocates;

calculating a strength of the conversation based at least in part on the first weighted score and the second weighted score;

generating a score for the topic based at least in part on the strength of the conversation; and

displaying the score of the topic on a display.

2. The method of claim **1**, further comprising identifying a relevance of the signals or accounts to the contextual dimensions and generating the analytics for the contextual dimensions based on the relevance.

3. The method of claim **1**, further comprising:

periodically generating the analytics for the contextual dimensions for different time periods;

using a first set of the analytics for a first one of the time periods as a benchmark; and

comparing the first set of analytics to a second set of the analytics for a second one of the time periods to identify changes in the analytics.

4. The method of claim **1**, comprising:

identifying a first set of the signals associated with a first one of the contextual dimensions;

generating a first set of analytics for the first one of the contextual dimensions from the first set of the signals;

identifying a second set of the signals associated with a second one of the contextual dimensions;

generating a second set of analytics for the second one of the contextual dimensions from the second set of the signals;

using the first set of analytics as a benchmark for comparing with the second set of analytics.

5. The method of claim **4**, wherein the first one of the contextual dimensions comprises an industry and the second one of the contextual dimensions comprises a brand within the industry.

6. The method of claim **4**, wherein the first one of the contextual dimensions comprises a brand and the second one of the contextual dimensions comprises a competitor brand.

7. The method of claim **4**, wherein the first one of the contextual dimensions comprises a company and the second one of the contextual dimensions comprises a brand sold by the company.

8. The method of claim **4**, wherein the first one of the contextual dimensions comprises a brand and the second one of the contextual dimensions comprises a geographic region for the brand.

9. The method of claim **1**, further comprising:

identifying the accounts associated with the contextual dimensions as constituents of the contextual dimensions;

identifying the signals associated with the constituents; and

generating the analytics for the contextual dimensions based on the signals associated with the constituents of the contextual dimensions.

10. The method of claim 9, further comprising:
identifying the constituents generating positive messages about the associated contextual dimensions as advocates of the contextual dimensions;
identifying the constituents generating negative messages about the associated contextual dimensions as detractors of the contextual dimensions; and
identifying the constituents associated with the contextual dimensions and having a threshold number of followers as influencers of the contextual dimensions.

11. The method of claim 1, further comprising:
identifying the accounts associated with companies as company accounts;
identifying the accounts for employees of the companies as employee accounts; and
generating the analytics for the company accounts based on the signals associated with the employee accounts.

12. The method of claim 1, further comprising:
identifying social network sources associated with the contextual dimensions and having a threshold number of followers as influencers of the contextual dimensions;
adding the social network sources to the accounts; and
collecting signals from the social network sources added to the accounts.

13. The method of claim 1 further comprising:
calculating the strength of the conversation based at least in part on a sentiment of the messages for the conversation, wherein the sentiment includes positive, neutral, and negative reviews in the messages discussing the topic.

14. An analytic system, comprising:
a computing system including a processor configured to execute software instructions stored in memory, the software instructions comprising:
a collector module configured to collect signals from sources in a social network, wherein the sources are identified by accounts;
an enrichment module configured to identify:
relationships between the signals and the accounts;
the signals containing messages for a conversation discussing a same topic;
a first type of user participating in the conversation as influencers that have a plurality of followers; and
a second type of user participating in the conversation as advocates;
an analysis module configured to:
determine a first weighted score based at least in part on applying a first weight to a first portion of the messages generated by the influencers;
determine a second weighted score based at least in part on applying a second weight to a second portion of the messages generated by the advocates;
calculate a strength of the conversation based at least in part on the first weighted score and the second weighted score;
generate a score for the topic based at least in part on the strength of the conversation; and
a display module configured to display the score of the topic on a display device.

15. The analytic system of claim 14, further comprising multiple collector modules configured to collect the signals from different social networks and store the collected signals into time buckets, wherein some of the signals are collected by the collector modules polling the social networks and some of the signals are collected by the social networks streaming the signals to the collector modules.

16. The analytic system of claim 14, further comprising a normalize module configured to load data from the signals into a table and add identifiers to the signals identifying the accounts associated with the signals and identifying ecosystems for the accounts.

17. The analytic system of claim 14, wherein the enrichment module is further configured to identify contextual dimensions associated with the accounts.

18. The analytic system of claim 17, wherein the contextual dimensions comprise at least one of an industry associated with the accounts, a company associated with the accounts, brands or services associated with the accounts, and/or geographic regions associated with the accounts.

19. The analytic system of claim 17, wherein the enrichment module is further configured to identify some of the accounts as constituent accounts for other related accounts.

20. The analytic system of claim 19 wherein the constituent accounts comprise at least one of:
advocate accounts generating positive messages for the related accounts;
employee accounts for employees of companies associated with the related accounts;
partner accounts for the accounts of business partners of the companies associated with the related accounts;
market accounts having some interactions with the related accounts; and/or
influencer accounts having some interactions with the related accounts and having a threshold number of followers or subscribers.

21. The analytic system of claim 14, wherein the enrichment module is further configured to identify the signals associated with same conversations.

22. The analytic system of claim 21, wherein the enrichment module is further configured to:
identify the signals initiating the conversations;
identify types of messages used in the signals associated with the conversations;
identify contextual dimensions associated with the conversations; and
identifying a sentiment for the conversations.

23. The analytic system of claim 22, wherein the contextual dimensions comprise at least one of an industry, a company, a brand, and/or a geographic region associated with the conversation.

24. The analytic system of claim 14, wherein the analysis module is further configured to:
identify a social network source generating some of the signals;
identify the social network source has having a large number of subscribers; and
direct the collector module to add the social network source to the accounts and start collecting signals from the social network source.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,251,530 B1
APPLICATION NO. : 13/601151
DATED : February 2, 2016
INVENTOR(S) : Dachis et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the claims:

At column 22, line 56, at claim 24, change "identify the social network source has having a large num-" to -- identify the social network source as having a large num- --

Signed and Sealed this
Eighth Day of November, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office